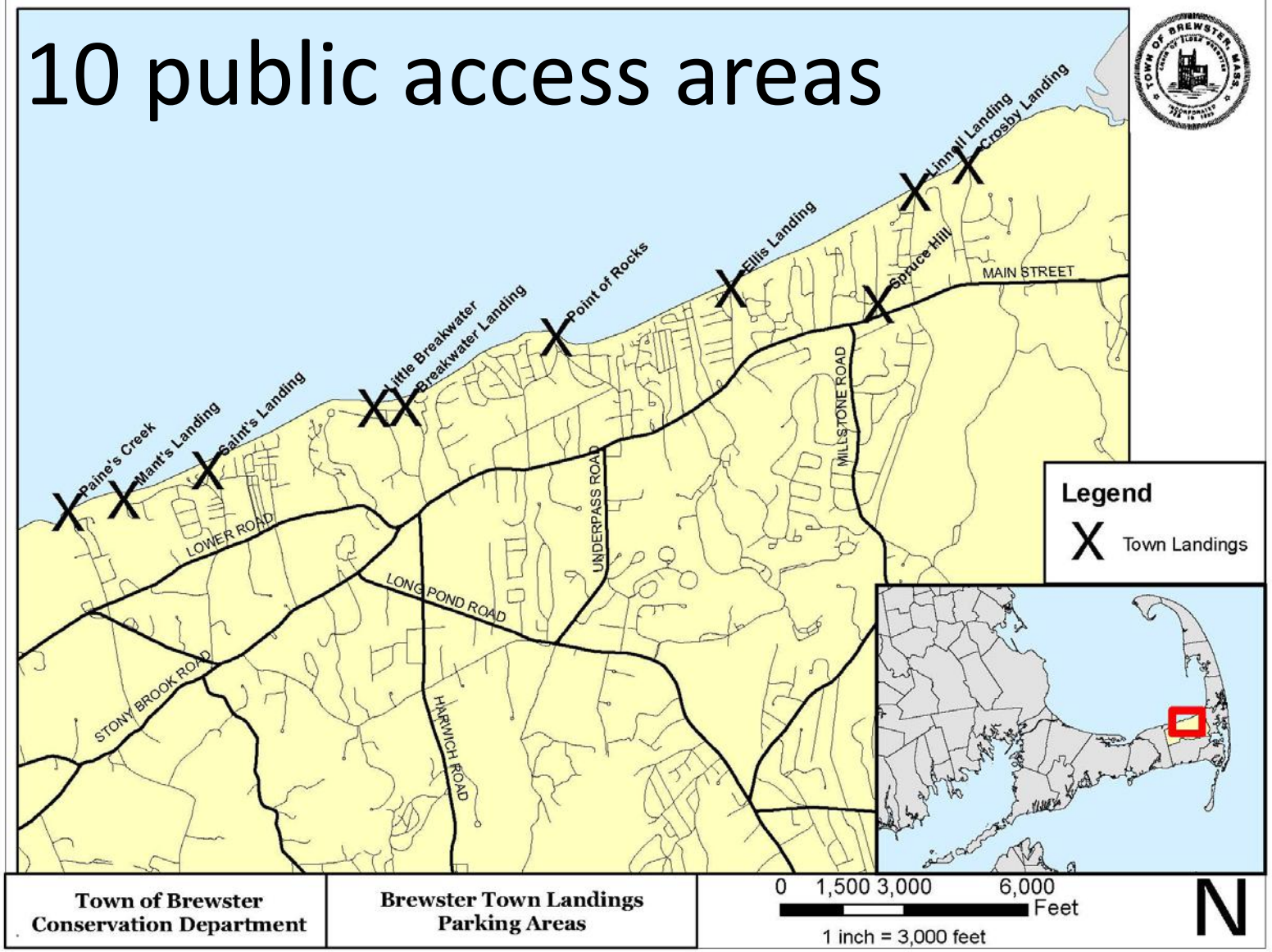
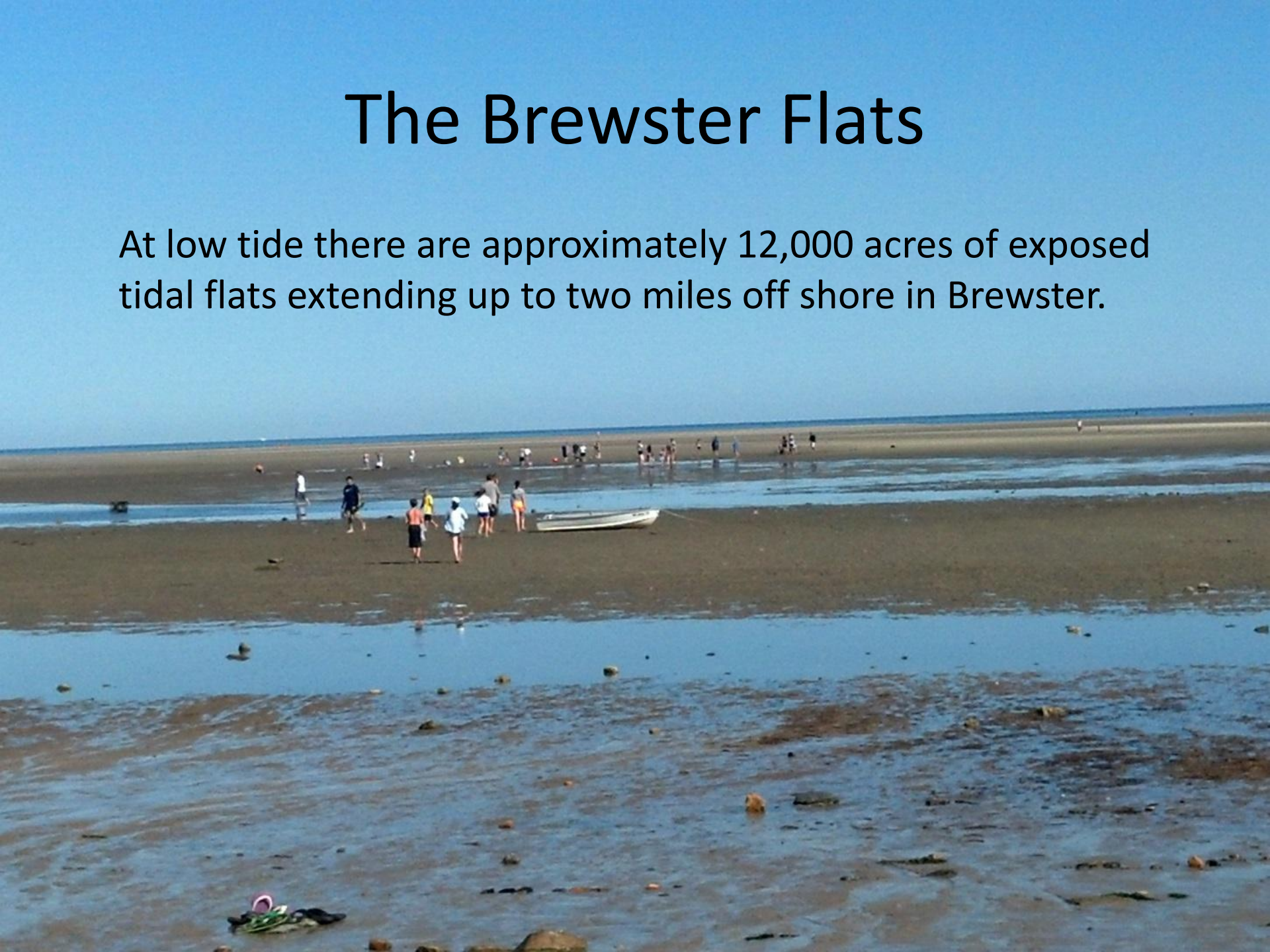
Long-term planning efforts to address landings in Brewster



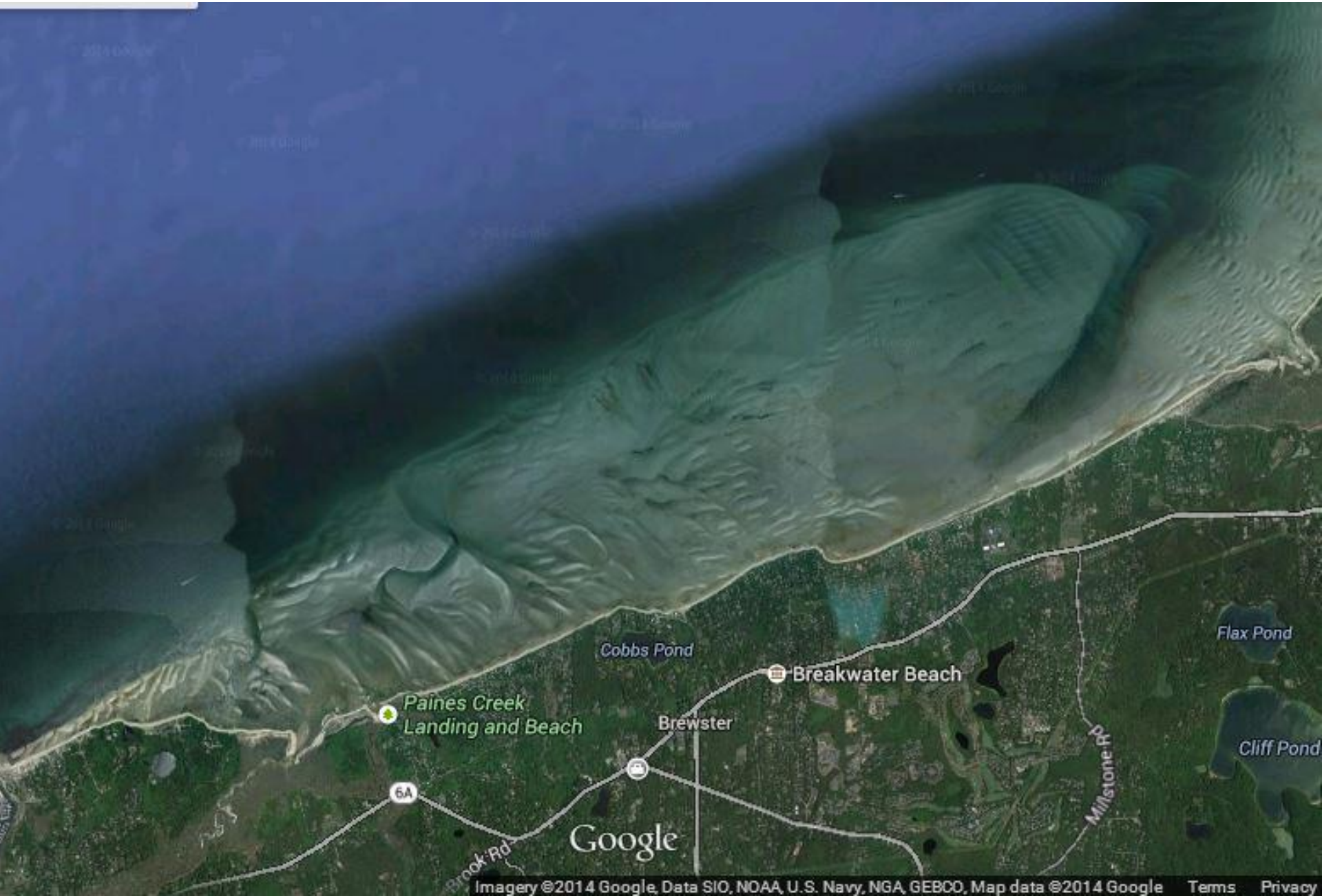
Parking spaces: Crosby 60, Linnell 25, Spruce Hill 12, Ellis 19, Point of Rocks 3 + 8, Breakwater 62, Little Breakwater 6, Saints 38, Mants 44, Paines Creek 19 =296.

The Brewster Flats

At low tide there are approximately 12,000 acres of exposed tidal flats extending up to two miles off shore in Brewster.



Brewster Flats



The Problems…

- Repetitive losses
- Erosion rates of up to 2 feet/year (15’ in Sandy and related storms)
- Now, little or no buffer between infrastructure and the beach
- Loss of parking while increasing demand for access
- Rising sea level
- More severe storms, increasing frequency
- Higher rainfall amounts – poor stormwater infrastructure

The Approach

Brewster's approach:

- a comprehensive approach - assessment, planning, design
- integrating coastal science and technical information
- public participation
- a plan that will be the foundation for future Town actions

Recent coastal reports and recommendations

- 2003: Landing issues and recommendations report by Sea Grant/Barnstable County coastal specialist
- 2008: DPW state of landings with recommendations
- 2010: Natural Resources Coastal Atlas with status and recommendations
  - Updated 2011, 2013 , new update in 2015 underway
- Coastal storm video February 2013 (video on local access)
- Selectmen beach tour June 2013 (video on local access)
- CZM Grant reports (sediment study, beach profiles, photodocumentation, natural system monitoring, public outreach/education on erosion issues): fall 2015

How Brewster has Responded to Storm Damage to Date

- Purchase of coastal salt marsh and extensive open space
- Removal/restoration of coastal restrictions
  - Namskaket under bike trail, new culvert in 2007
  - Quivett Creek culvert under Sea Street in 2006
  - Rt. 6A culvert at Paines Creek 2009 (ARRA grant)
  - Freemans Pond culvert 2013
- Paines Creek parking lot project
- NRCS, state stormwater grants
  - Watershed approach, protect shellfish beds.
  - From headwater Mill Pond complex to shore at Stony Brook/Paines Creek

Coastal Adaptation Project

- Measuring the volume, rate and direction of sand movement of Brewster's entire coast, i.e. a sediment budget
- Photo-documenting and habitat monitoring at each coastal Landing;
- Engineering evaluation of each Landing and beach
- Developing short and longer term management recommendations based upon condition of landing, sand movement and the natural systems surrounding each location.
- Designing a major coastal retreat design for Breakwater, one of the largest beach parking lots, including restoring former parking areas to coastal dune and green stormwater control;
- Designing for a measured retreat at two landings, [Ellis Landing and Mant's Landing] that have suffered significant repetitive losses

Sediment Budget study

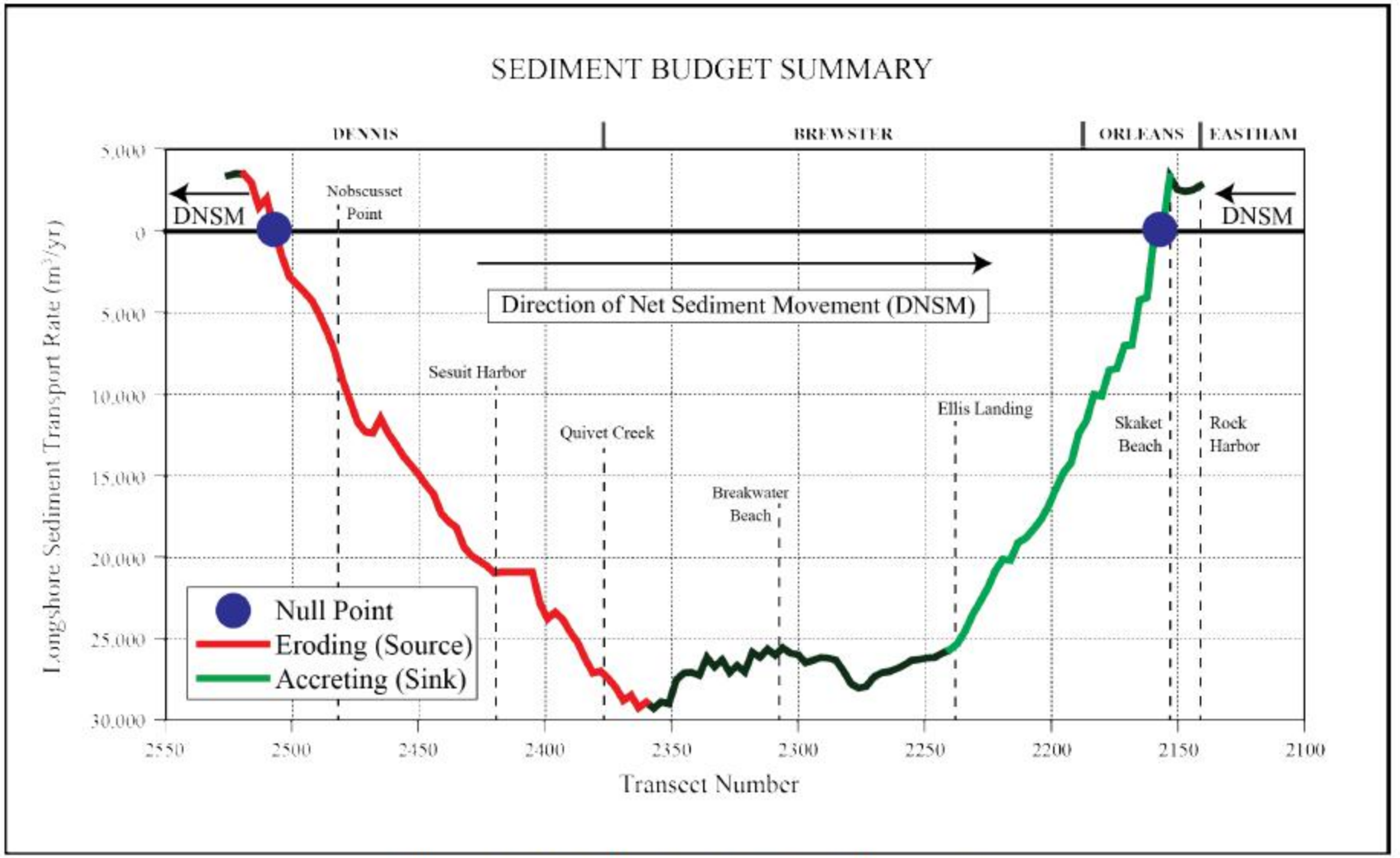
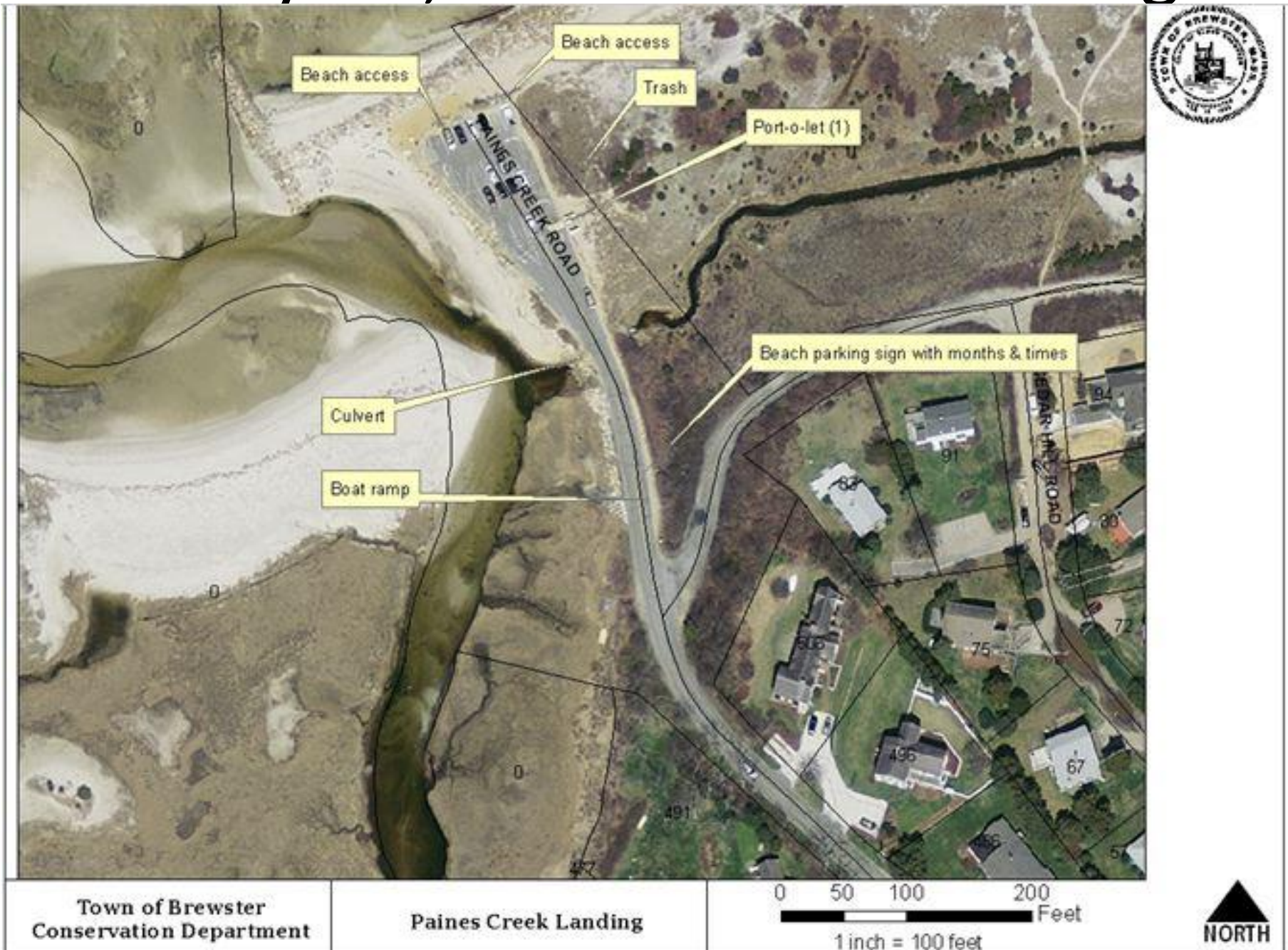


Figure 8: Distribution of *Q* for all transects.

Paines Creek Landing

Figure 1. 2005 aerial of Paines Creek Beach, Brewster, MA (Mass GIS).

Old layout, Paines Creek Landing



New Layout Paines Creek Landing


Stone Dike
Groin Structures
Dune Area
Area of Erosion
Entrance to Stony Brook
Culvert Connecting
to Freemans Pond

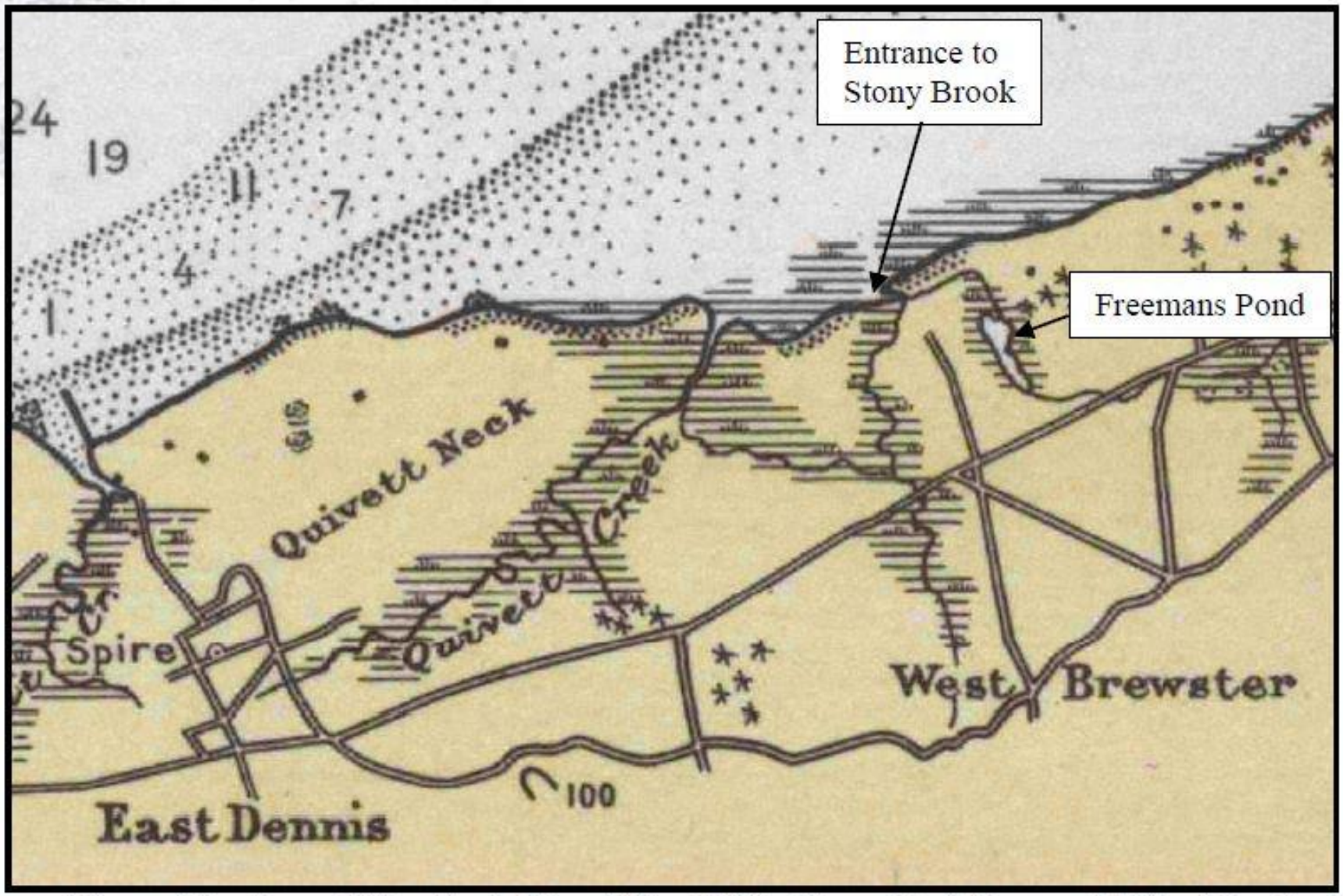


Figure 16. Portion of Nautical Chart No. 1208, Cape Cod Bay published by the U.S. Coast and Geodetic Survey in 1933 (Mass GIS).

2009

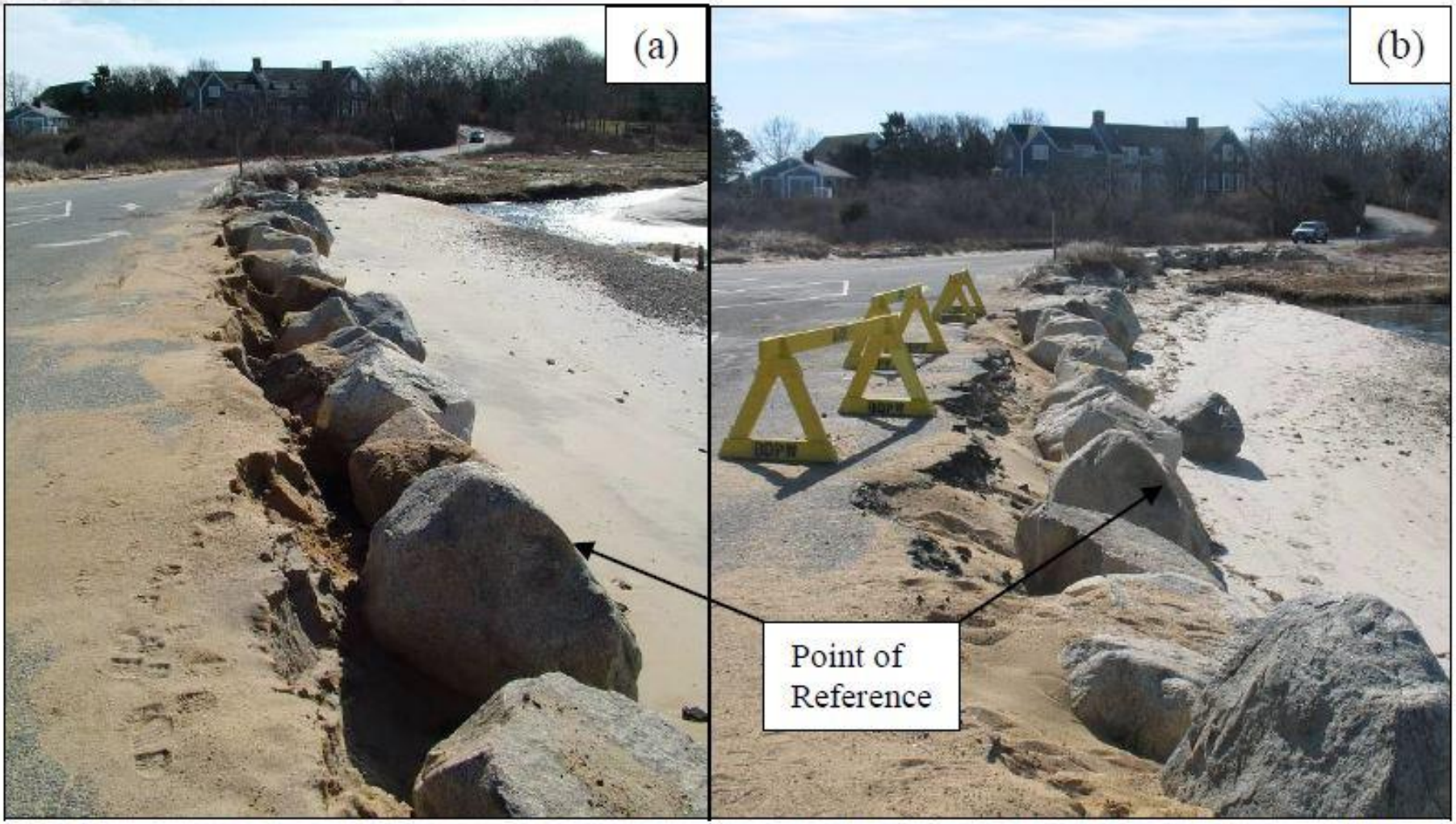


Figure 7. Progressive erosion occurring at western end of Paines Creek Beach parking area. Panel (a) is photo taken on February 13, 2009 (looking southeast) while panel (b) shows same view taken on March 26, 2009.

January 20, 2010


BDPW

2010: AmeriCorp places over 1,000 sandbags, extensive renourishment with sand, repaving. Additional winter storms damaged sand bags, removed more sand, damaged more parking lot.

Stormwater erosion from parking area at southeast side on March 14, 2010.

2011

- Repeat of 2010, with extensive damage to parking area, loss of pavement and asphalt fragments throughout beach and creek.
- AmeriCorp helps install another 1,000 sandbags to shore up area.
- Very short term repair, additional damage in spring.

Table 5. Alternatives analysis for shoreline protection at Paines Creek Beach

ALTERNATIVE	Overall Effectiveness	Shoreline Stabilization	Structural Lifetime *	Permitability	Permitting / Engineering Cost	Construction Cost *	Construction Feasibility	Maintenance Requirements
1. Do Nothing	○	○	N/A	N/A	N/A	N/A	N/A	○
2. Stone Revetment	●	●	●	◎	◎	○	●	●
3. Vertical Wall/bulkhead (timber/steel/composite)	●	●	●	○	○	○	◎	●
4. Rock-filled Gabion Baskets	◎	◎	◎	○	○	○	◎	◎
5. Coir Logs	◎	◎	○	●	●	●	◎	◎
6. Cobble Berm	◎	○	○	◎	◎	◎	●	○

* = Relative to other alternatives, varies depending on alternative items and local costs

● = Good

◎ = Medium

○ = Poor

N/A = Not Applicable

NRCS Stormwater Grants

- Saints Landing
- Paines Creek Road – North
- Paines Creek Road – South, including town landing
  - Instead of capturing and infiltrating stormwater at beach parking lot, we considered the retreat alternative, restoring the dune and building a similar sized lot in the road layout further inland.

Coastal Retreat

- Repetitive losses, high cost
- Environmental damage (asphalt/fill etc.)
- Long term likelihood of failure with rising seas and increasing storm intensity
- Hard solution would not be allowed
- Any permanent wall would result in loss of beach

Stormwater

- NRCS grant requires 75 year life for structure.
- Stormwater basins in a dune?
- Instead, repurpose grant to remove asphalt, restore to natural habitat, reconstruct a smaller and better designed and resilient parking area.

Winter storm “Nemo” in 2013

Sandy and Nemo

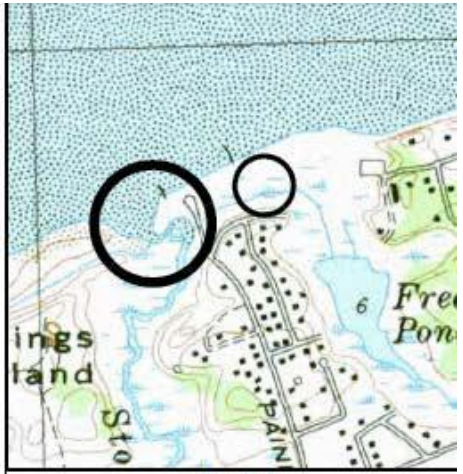
- Since parking lot retreat, several severe storms.
- Old parking lot would have likely suffered extensive damage, if not completely destroying it.
- Restored area lost a lot of beach sand.
- New parking area inundated but minimal damage.

Freemans Pond Culvert

Figure 9. Seaward end of culvert connecting Stony Brook with Freemans Pond showing deteriorating embankment protection (photo taken January 23, 2009).


Stony Brook
Paines Creek
Landing and Beach
Google

Paines Creek Footbridge



DATUM CONVERSIONS

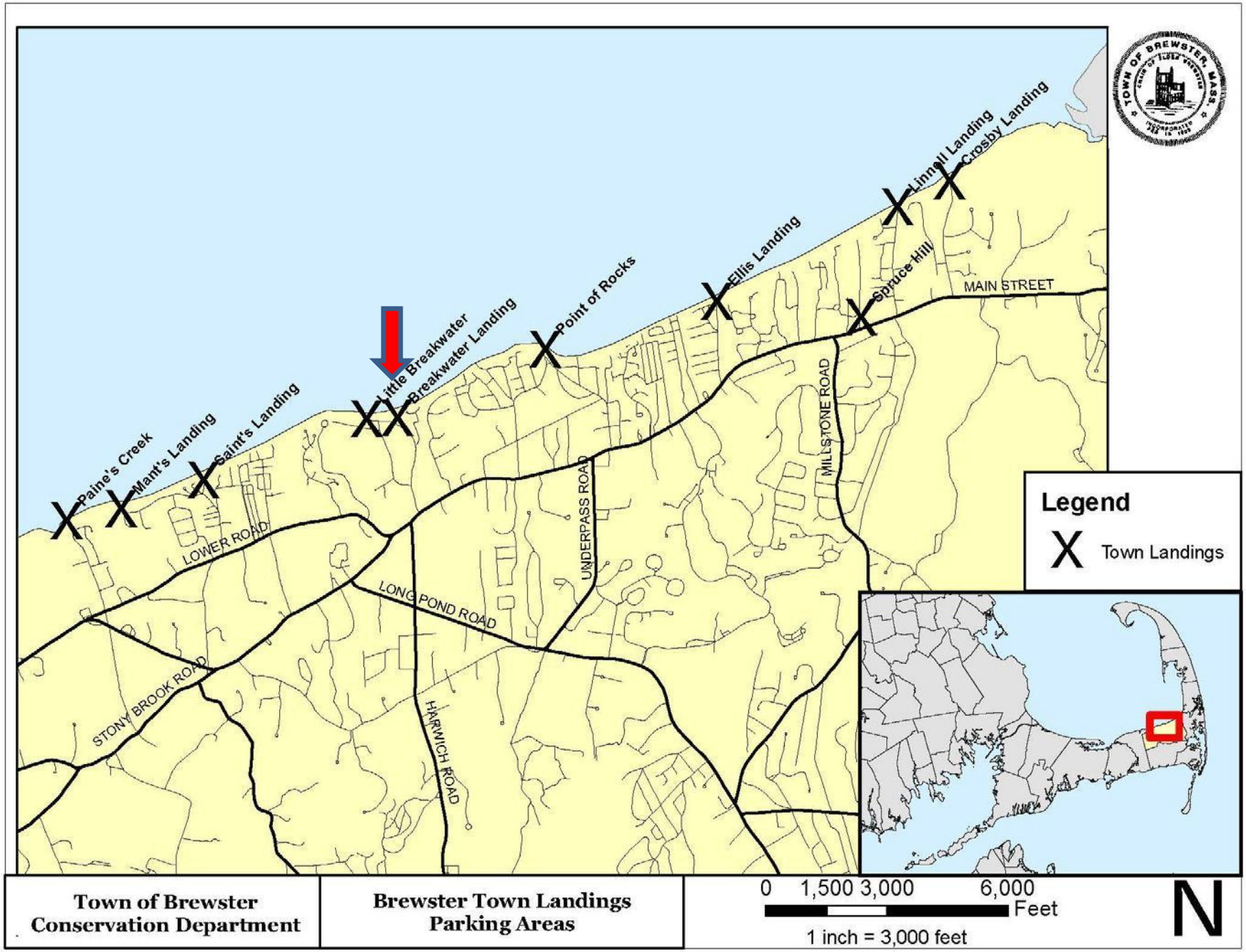
MLLW		NAVD88		MLW
12.70'	HTL	6.85'	HTL	12.43'
10.08'	MHW	4.23'	MHW	9.81'
5.85'	NAVD88 0.0	0.00'	NAVD88 0.0	5.58'
0.27'	MLW	-5.58'	MLW	0.00'
0.0'	MLLW	-5.85'	MLLW	-0.27'

LEGEND

SALT MARSH - MASS GIS

COASTAL DUNE - MASS GIS

Provides access to the center of the 1,600 foot plus public beach between Mants and Paines.


Paine's Creek
Mant's Landing
Saint's Landing
Little Breakwater
Breakwater Landing
Point of Rocks
Ellis Landing
Spruce Hill
Linnell Landing
Crosby Landing
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MILLSTONE ROAD
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LOWER ROAD
LONG POND ROAD
STONY BROOK ROAD
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Legend
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Town of Brewster
Conservation Department
Brewster Town Landings
Parking Areas
0 1,500 3,000 6,000
Feet
1 inch = 3,000 feet
N

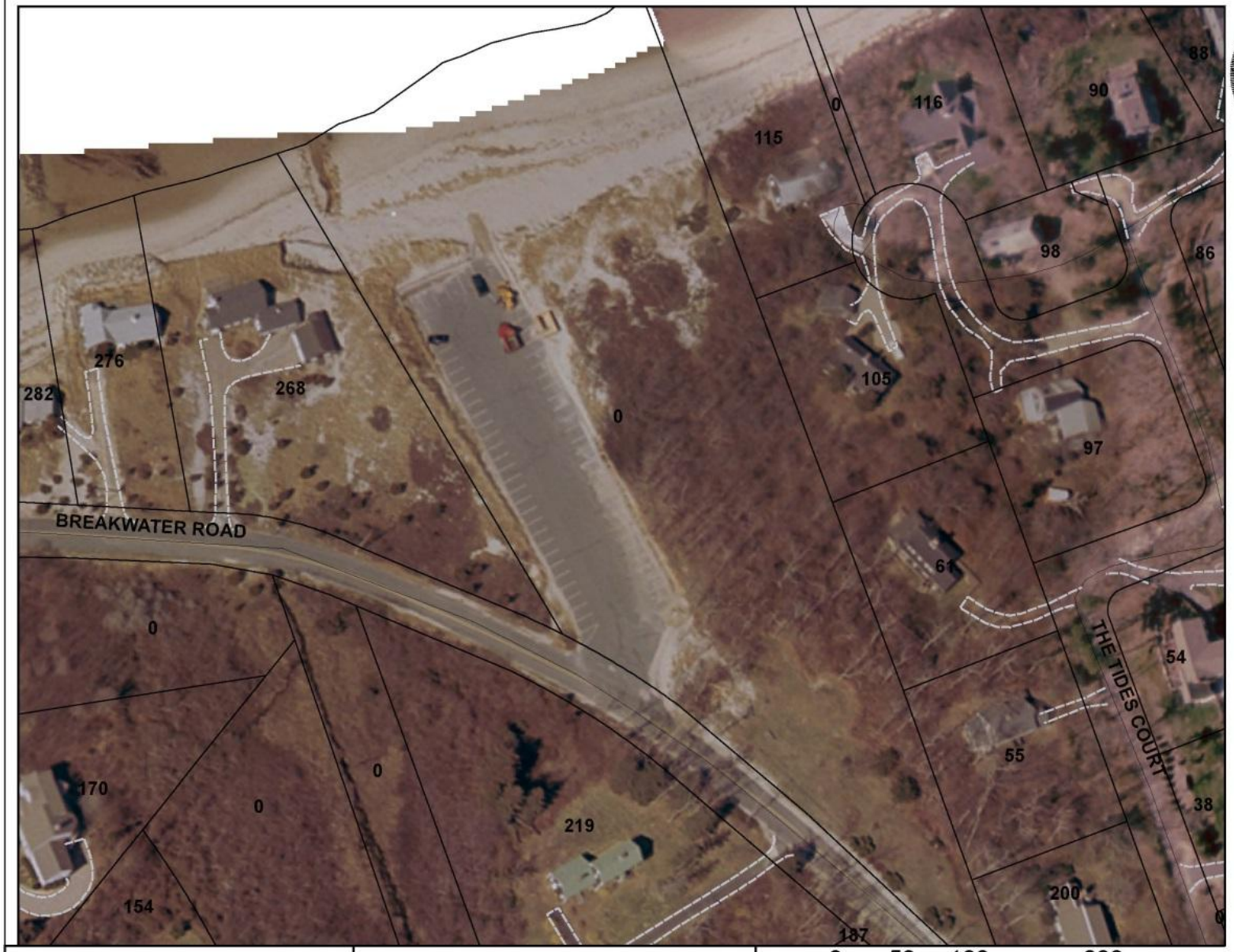
Breakwater Beach Resiliency Design

- **Relocation of Breakwater Landing Beach Parking Area, Restoration of Beach and Dune Habitat, Green Stormwater Infrastructure**:
  - **Outputs:** 100% design plans and bidding documents for removal and relocation of the parking lot, restoration of habitat, and improved access paths.
- **Green Infrastructure grant** awarded for construction: $155,000 plus town match of $59,675 (CPC spring 2014) and $10,000 (fall 2014).

Breakwater Bath house c.1900

Breakwater Beach Bath Houses c.1900

Some of these bath houses were owned by the town, with the town collecting the rent (in 1930 about $7 for the summer), and some were privately owned. The last bath houses were torn down in 1945 when the property was sold.



Town of Brewster
Conservation Department

Breakwater

0 50 100 200 Feet

1 inch = 100 feet

N

Breakwater January 3, 2010

Breakwater –Rebuilding/replacing the artificial dune in January 2010

Breakwater March 3, 2010.

Winter storms removed remnants of dune north end of parking lot, causing the lot to be undermined. January 2010, sand was placed to provide additional protection for the remainder of the winter. The sacrificial dune was destroyed; additional parking area was lost. The parking lot elevation is low, and unless protected, we may expect additional loss of pavement each year, in part due to the lack of sediment transport from further west (revetments and groins).

Breakwater March 2010

March 3, 2010

Stormwater currently collects in the northwest corner of the lot, causing erosion of the dune as it moves north onto the beach. At times this forms a deep very large puddle, forcing a hole through the dune over time. The grant proposal would eliminate the direct stormwater discharge onto the beach, reduce the volume of stormwater generated, and treat the stormwater through natural bio-swales or porous pavement.

Breakwater May 2010

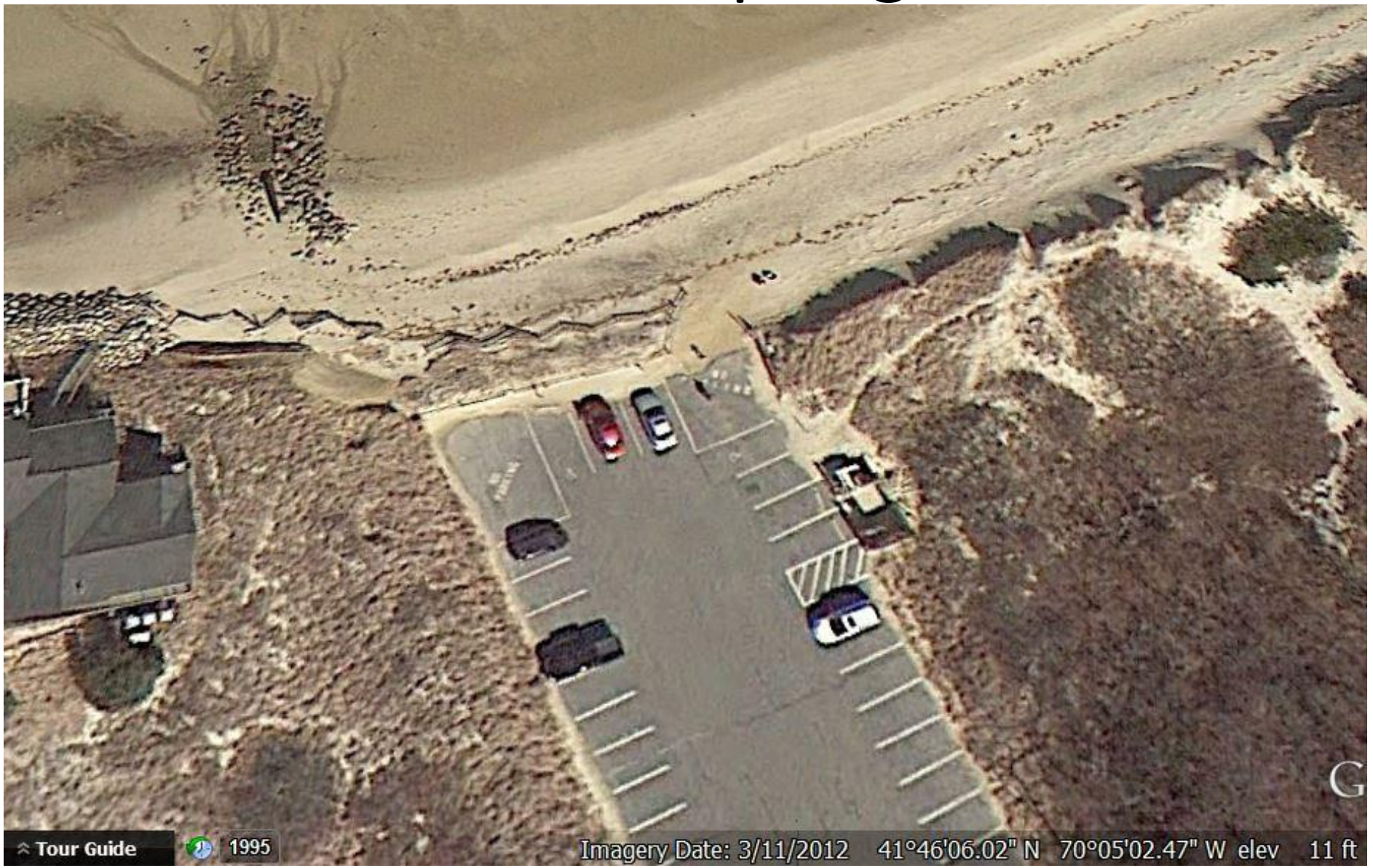
April 2011 dune restoration with Brandeis students

Winter 2012/2013

Winter 2012/2013

March 7, 2013

Breakwater spring 2013



March 26, 2014

Storm left debris, wrack and eroded sand from base of dune at sturdy sand fence located at north end of parking lot at Breakwater.

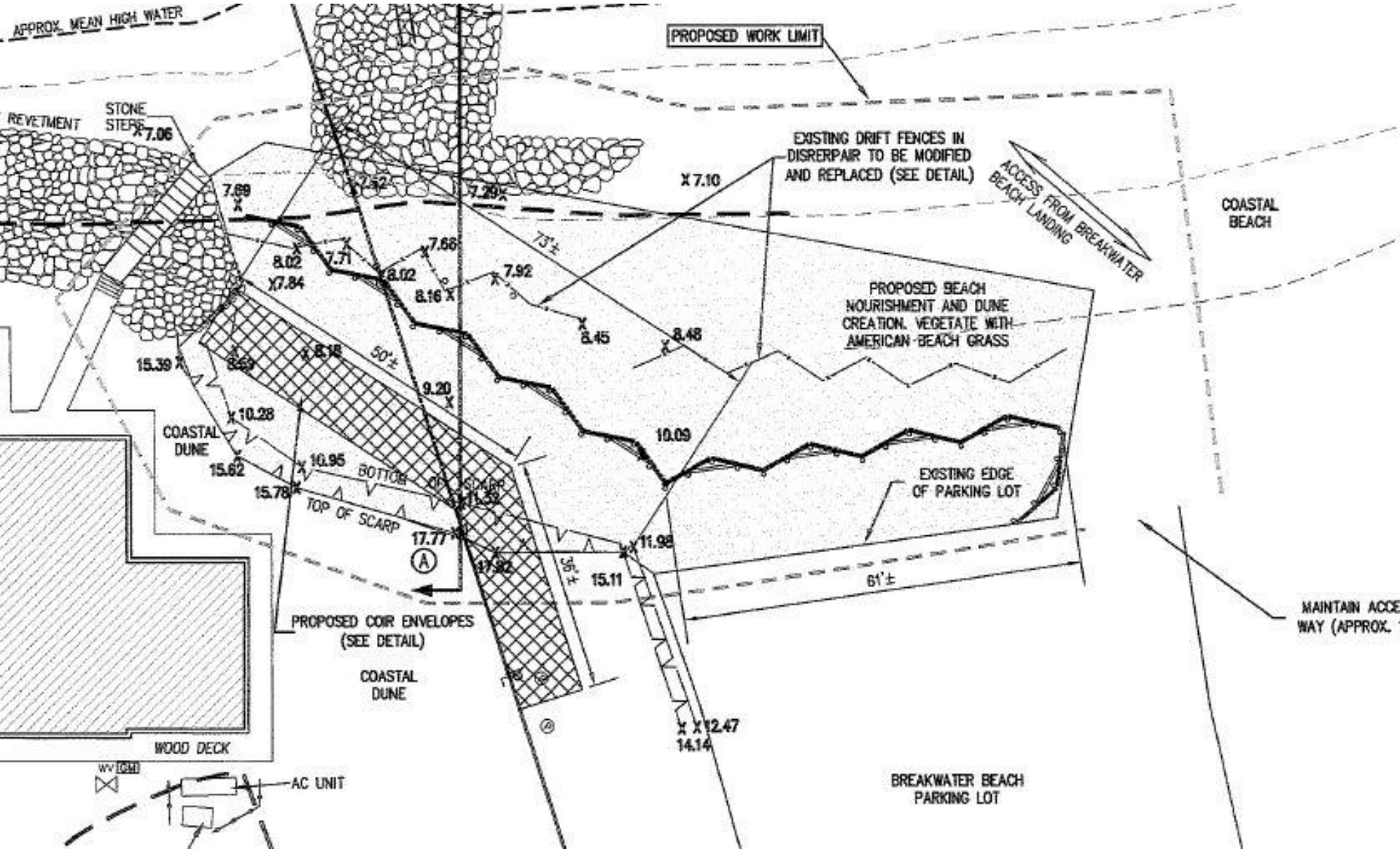
March 26, 2014

Storm left wrack and wind and wave born sand into paved parking area at Breakwater.

Since 2010

- Much larger sacrificial dune supported by sturdy sand fence
- Beach grass planted on dune to add resiliency
- Size of dune allows infiltration of stormwater without a “blow out” through dune or entrance.
- Neighbor to west improves end of revetment with reinforced coir logs, sand nourishment, sturdy sand fence.

End scour from revetment to west



April 2, 2014

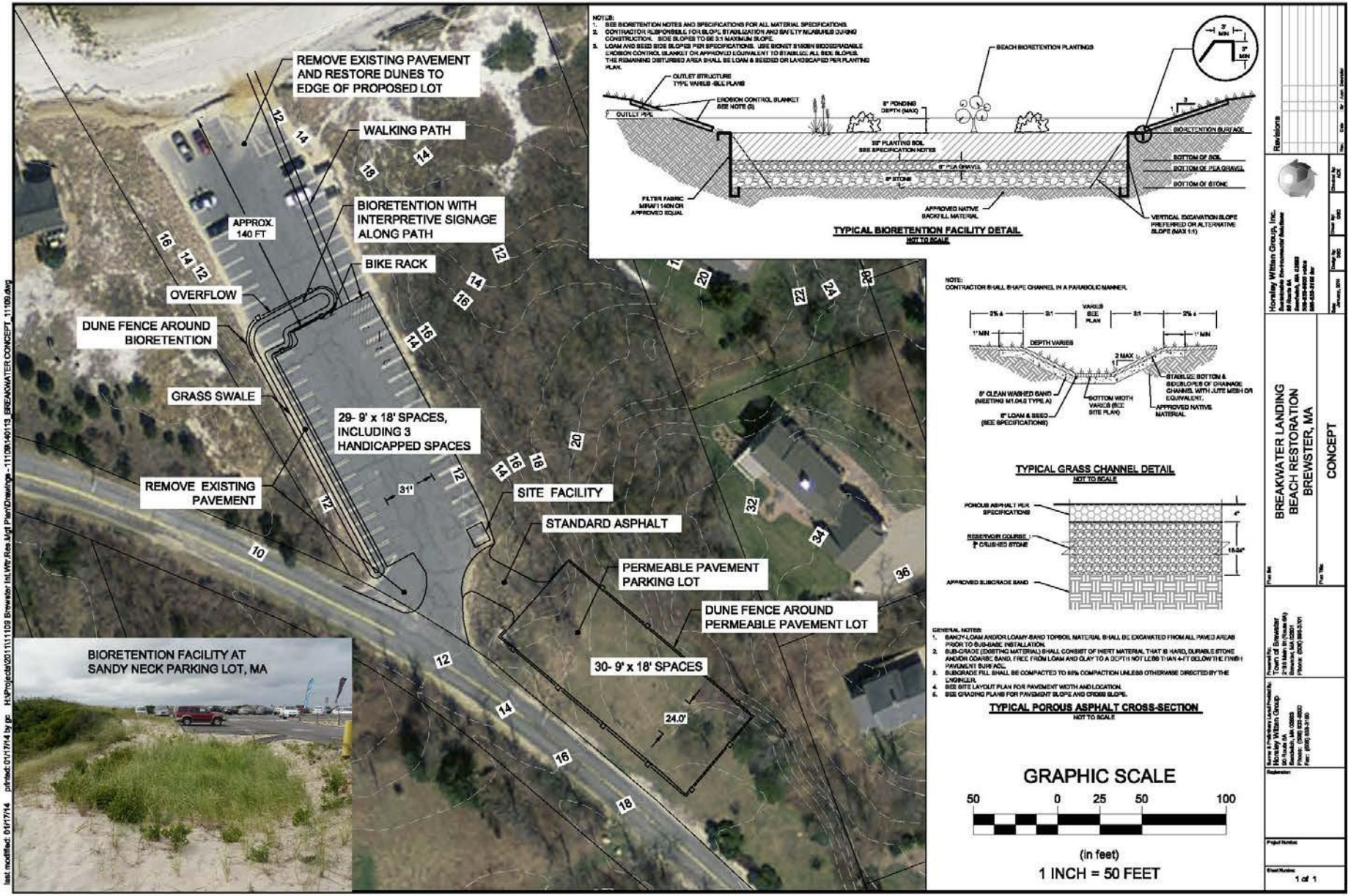
Sturdy sand fence (green oak timbers) prior to burying with beach sand. Note coir envelope protecting adjacent house west of landing.

Sturdy sand fence in sacrificial dune at Breakwater

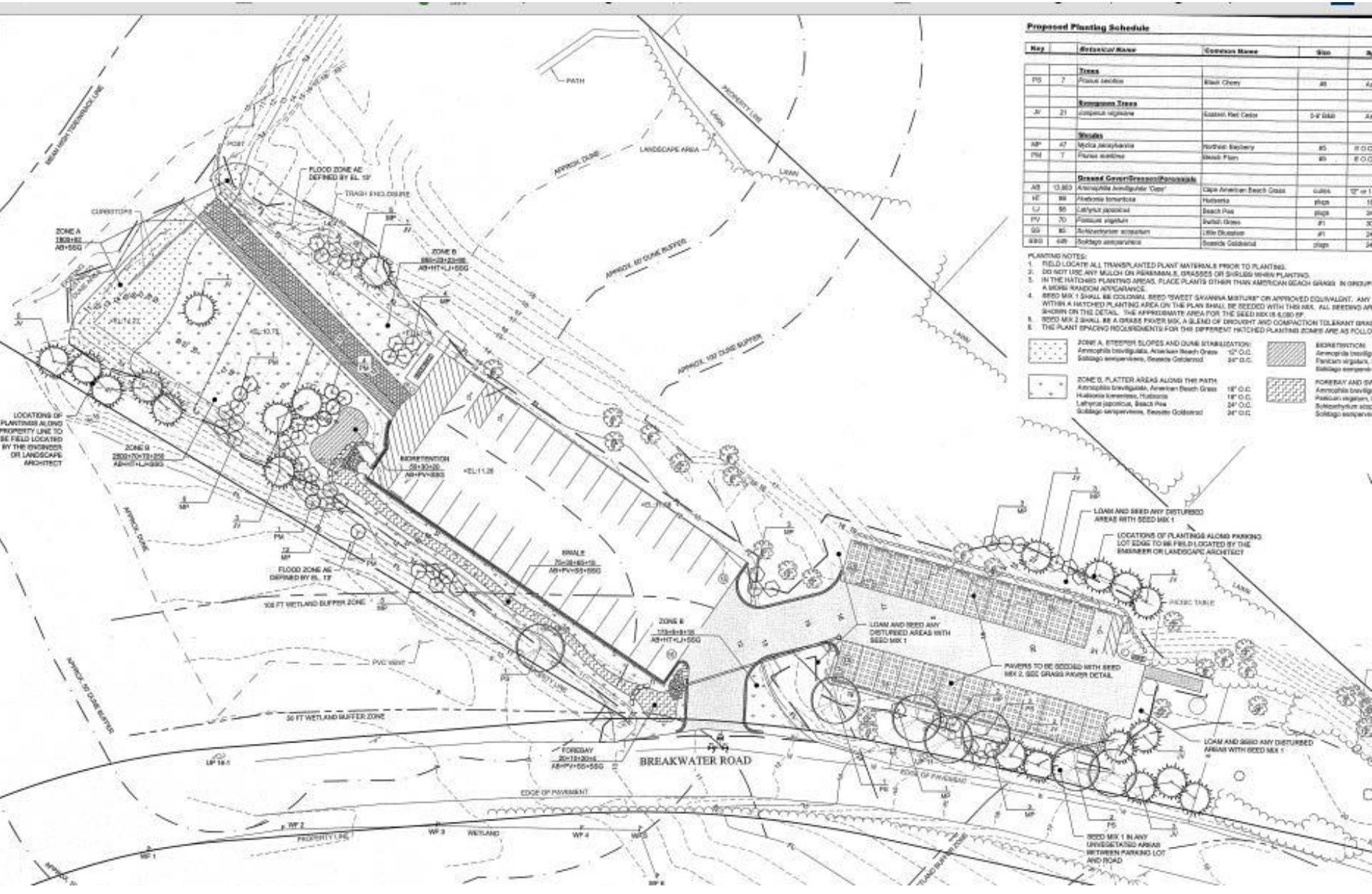
Sturdy fence buried under new dune located slightly further from active beach.


RESERVED
PARKING

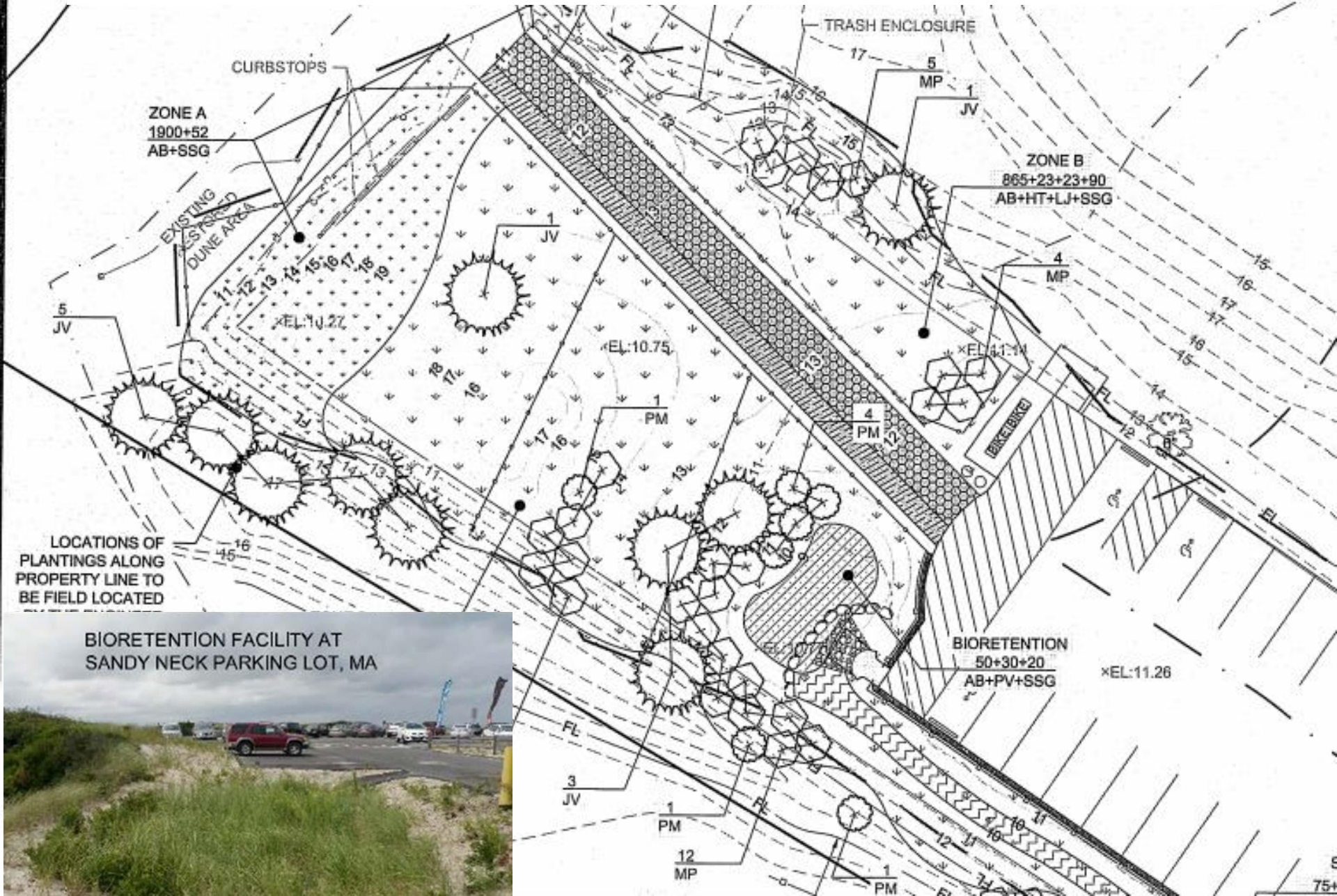
Conceptual Plan



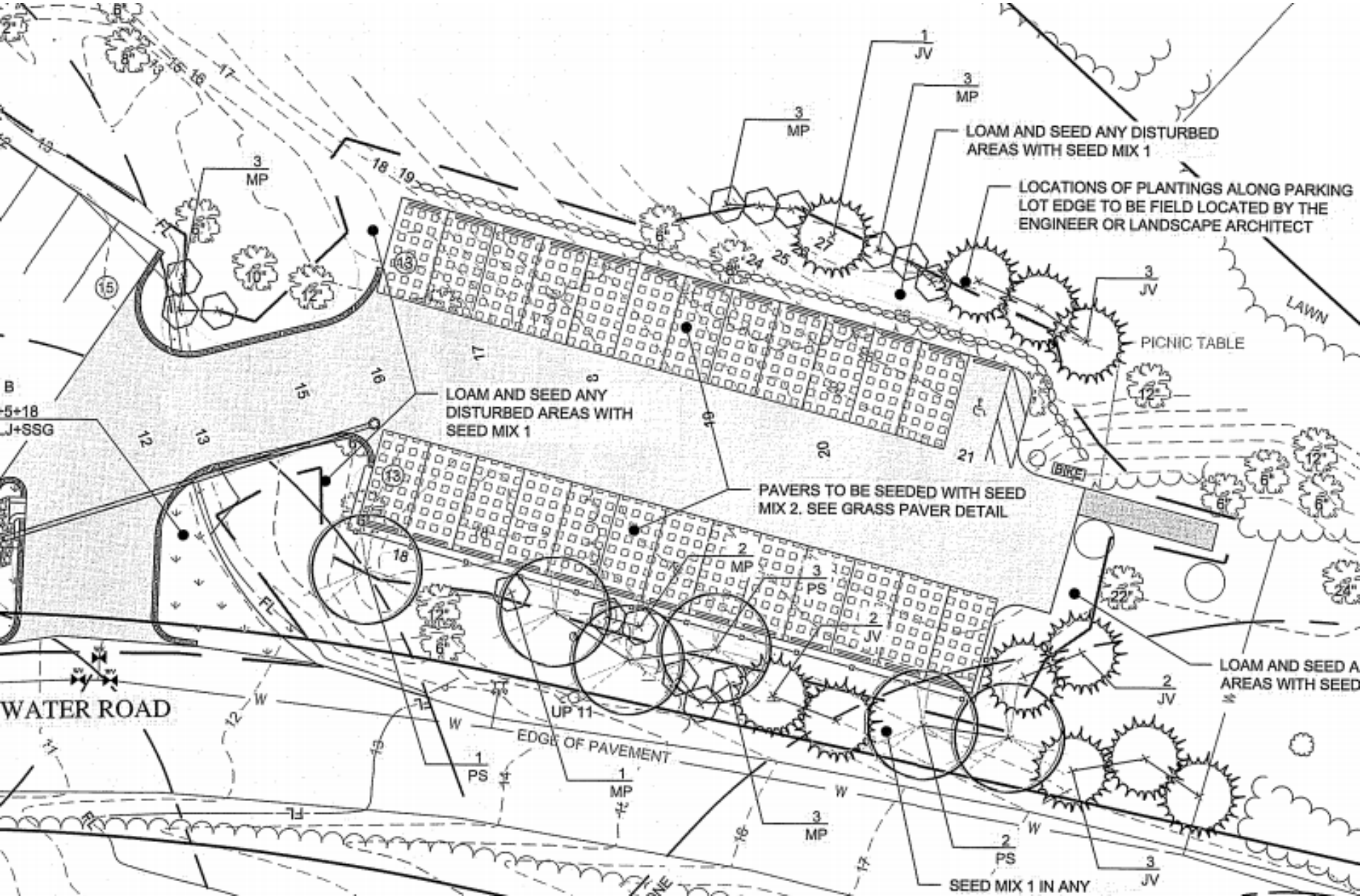
Final revised plan



Concept: Retreat and rebuild



New replacement lot

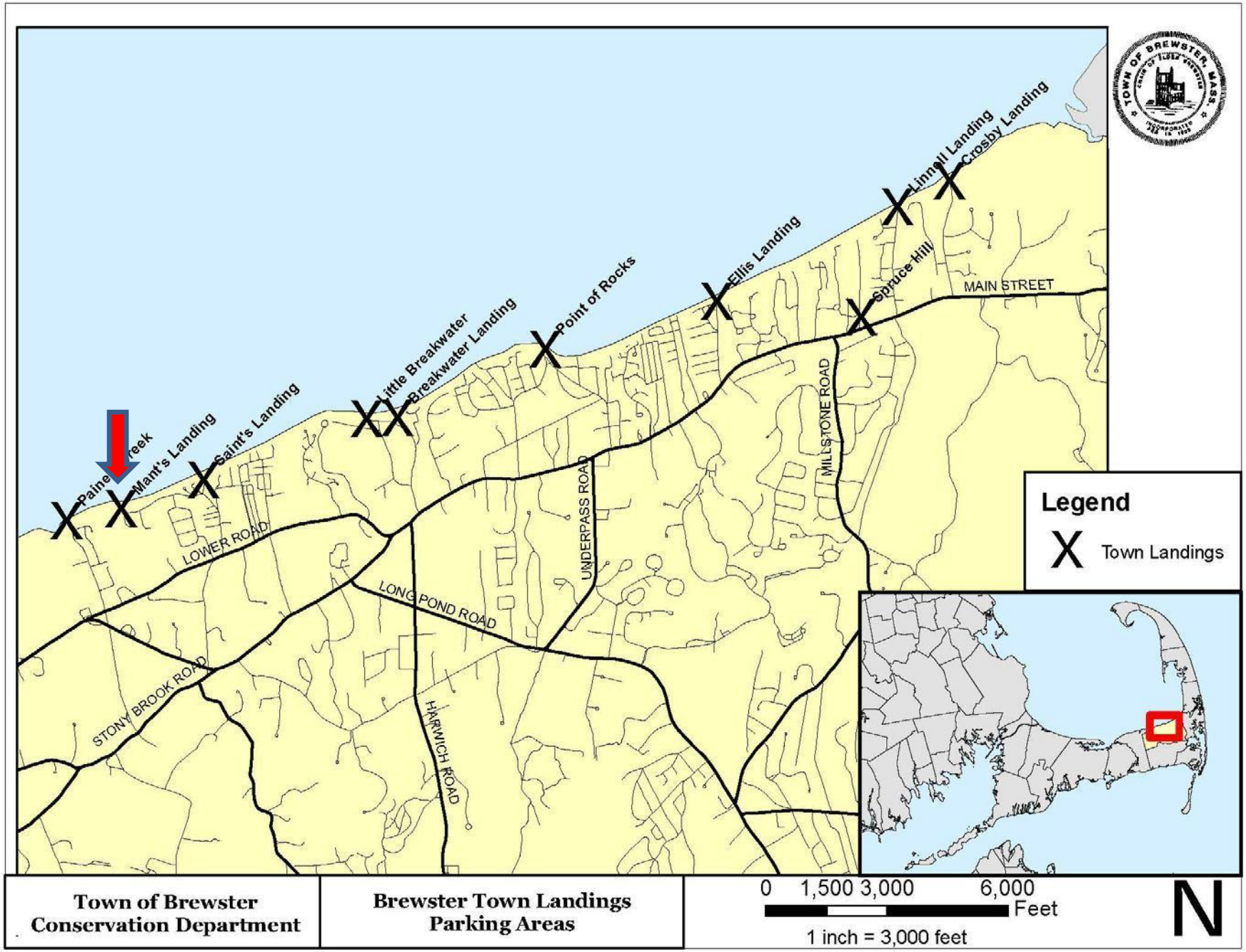


Details

- Restore area to coastal dune, add beach sand to increase elevation to match surrounding, plant beach grass and shrubs.
- Articulating concrete mat under sand to allow vehicle traffic access through dunes for emergency response, coastal nourishment projects.
- Seasonal boardwalk through dunes to beach.
- Interpretive displays.

Adaptive Management of Mant's Landing:

- The paved parking area at Mant's Landing Beach is located in a dune at a very low elevation, and suffers from repetitive storm damage.
- Use of a removable flexible articulating concrete mat as an interim replacement for a paved parking area on a beach until a permanent solution can be found.
- Raise grade at rear of property to lessen flooding


Paine Creek
Mant's Landing
Saint's Landing
Little Breakwater
Breakwater Landing
Point of Rocks
Ellis Landing
Spruce Hill
Linnell Landing
Crosby Landing
MAIN STREET
MILLSTONE ROAD
UNDERPASS ROAD
LOWER ROAD
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HARWICH ROAD
Legend
Town Landings
Town of Brewster
Conservation Department
Brewster Town Landings
Parking Areas
0 1,500 3,000 6,000
Feet
1 inch = 3,000 feet
N

Articulating concrete mat

Blocks connected with flexible cable

Mants May 2010

Mants March 2010

January 2013 Mants

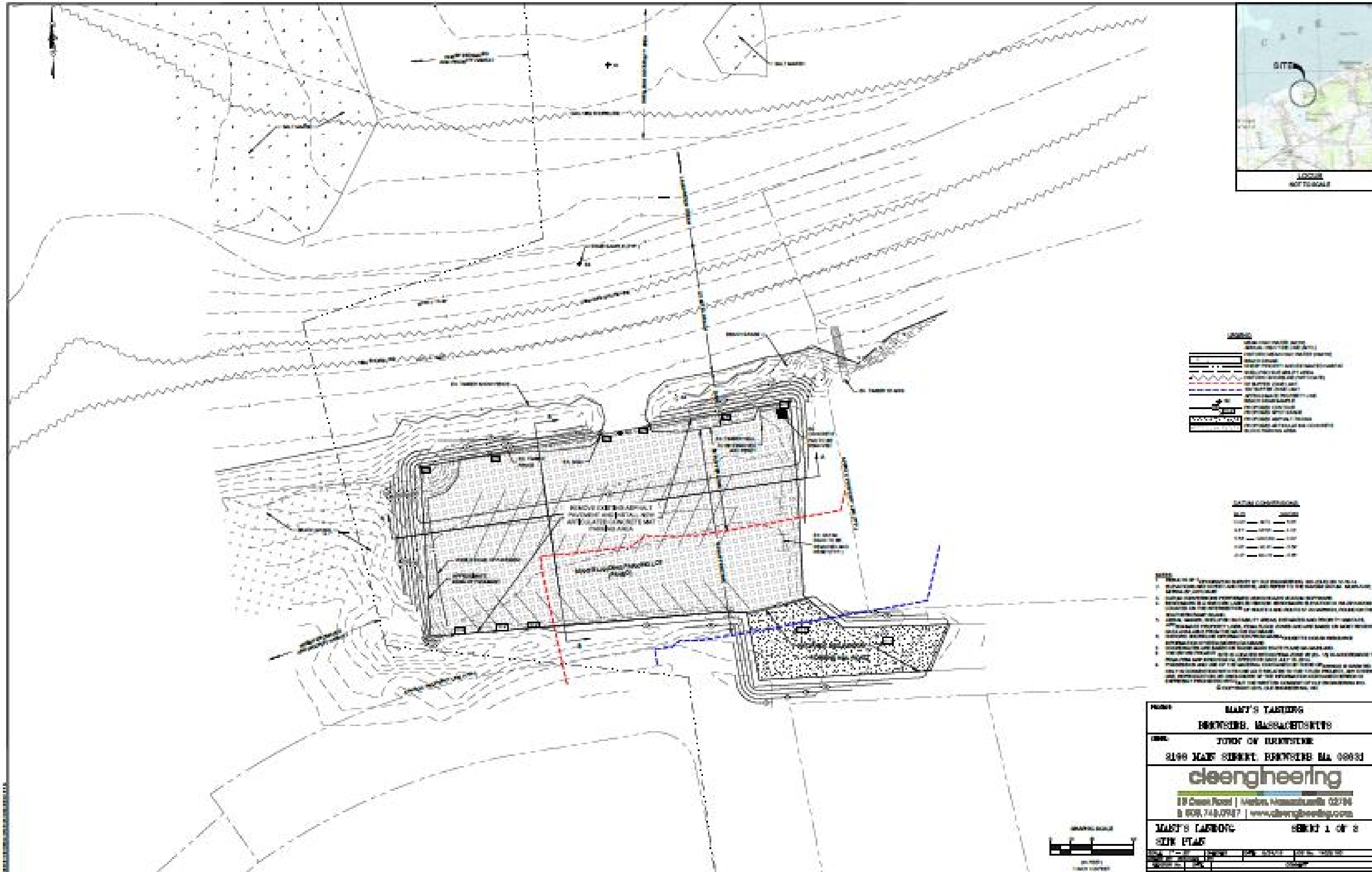
Winter storm removed sacrificial dunes. Rebuilt in early February 2013.

Mants February 2013

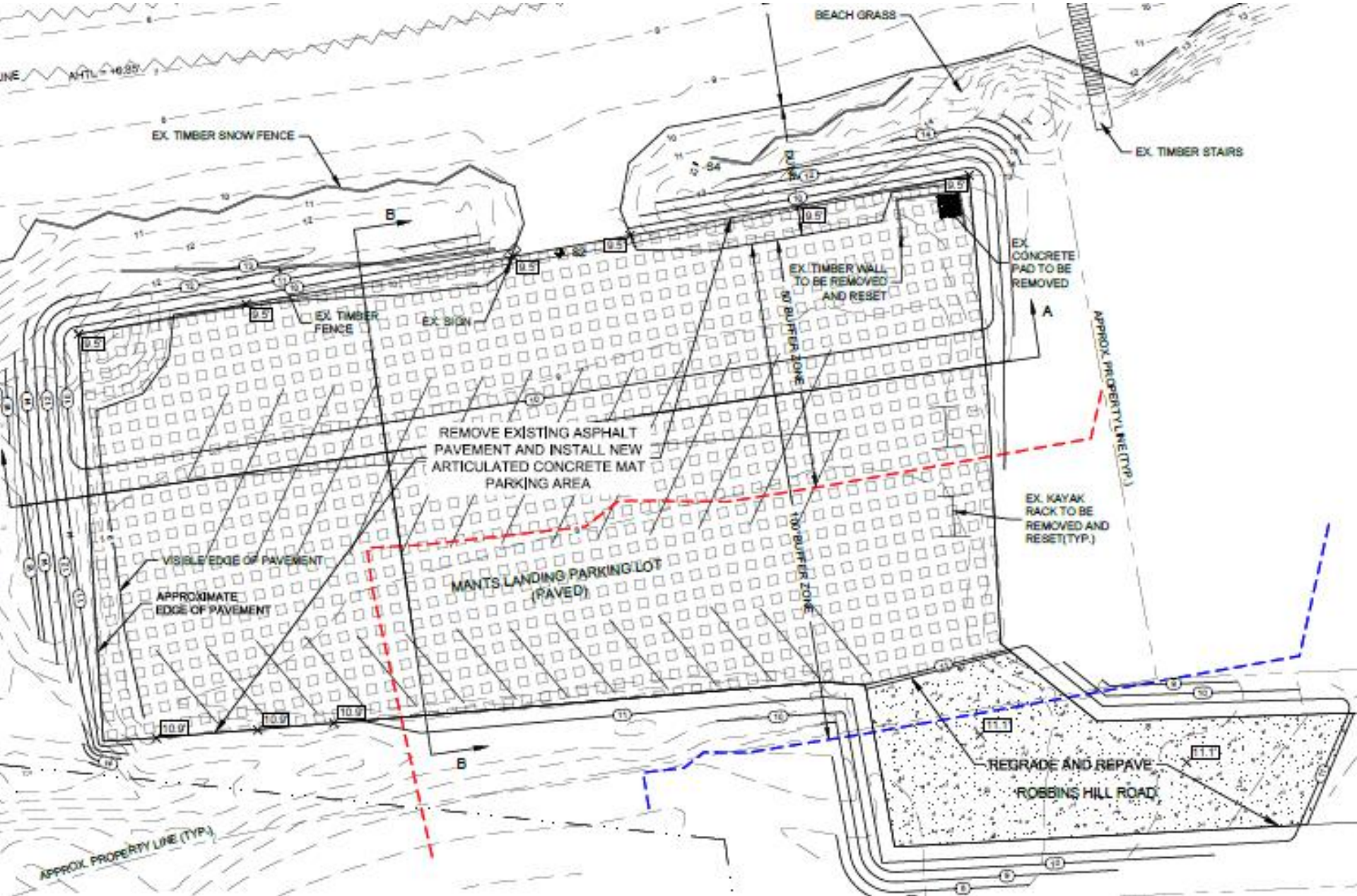
Nor’easter Nemo. Dunes destroyed, parking lot asphalt lifted and damaged.


JCB

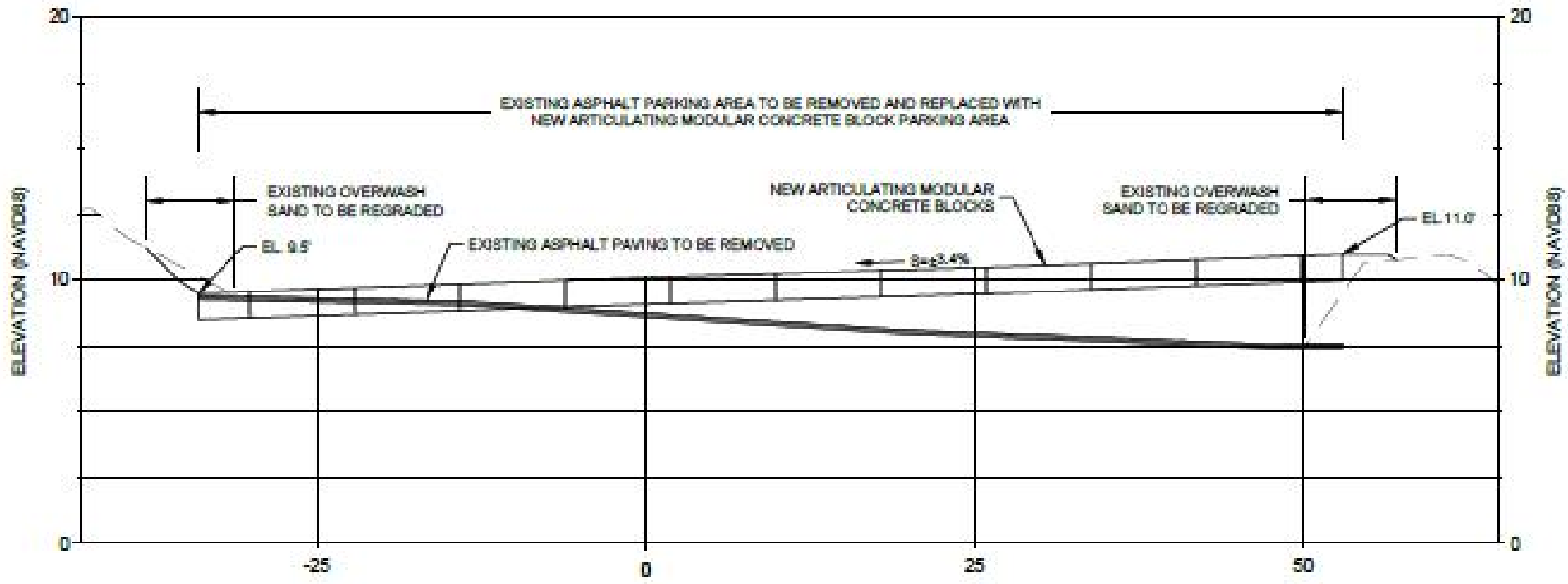
Mants Landing March 2015



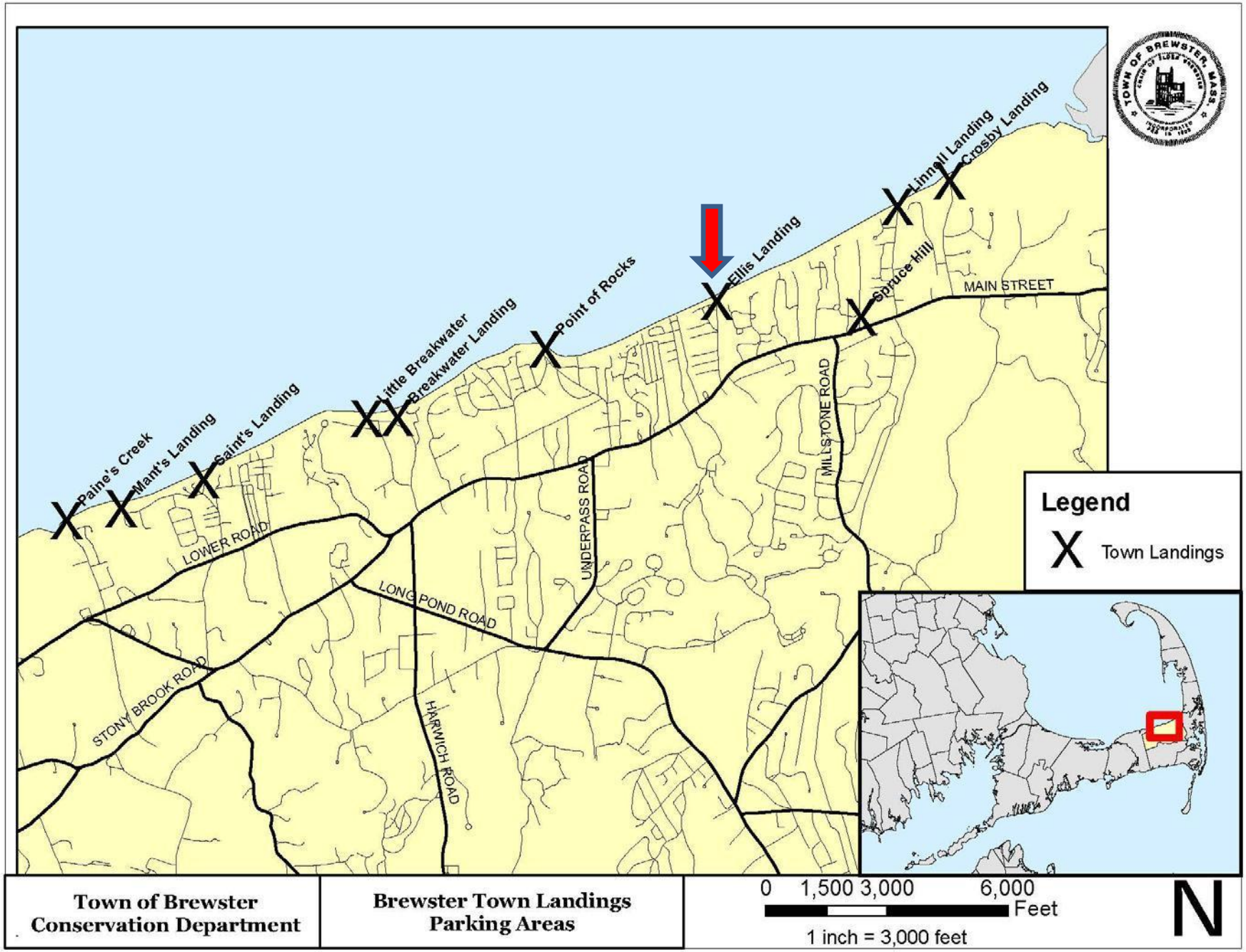
MANT'S LANDING
BREWSTER, MASSACHUSETTS
TOWN OF BREWSTER
2198 MAIN STREET, BREWSTER MA 02631
cleengineering
MANT'S LANDING
SITE PLAN
SHEET 1 OF 2


BEACH GRASS
EX. TIMBER SNOW FENCE
EX. TIMBER STAIRS
EX. TIMBER FENCE
EX. SIGN
EX. TIMBER WALL TO BE REMOVED AND RESET
EX. CONCRETE PAD TO BE REMOVED
50' BUFFER ZONE
APPROX. PROPERTY LINE (TYP.)
REMOVE EXISTING ASPHALT PAVEMENT AND INSTALL NEW ARTICULATED CONCRETE MAT PARKING AREA
EX. KAYAK RACK TO BE REMOVED AND RESET(TYP.)
VISIBLE EDGE OF PAVEMENT
APPROXIMATE EDGE OF PAVEMENT
MANTS LANDING PARKING LOT (PAVED)
REGRADE AND REPAVE
ROBBINS HILL ROAD
APPROX. PROPERTY LINE (TYP.)
A
B
B

Beach to left (North)



TYPICAL SECTION B-B
HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=5'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Parking Areas
0 1,500 3,000 6,000
Feet
1 inch = 3,000 feet
N

Planning and Design for Managed Retreat at Ellis Landing

- Provide sustainable public access that minimizes or avoids impacts on habitat, and reduce the risk of damage and need for continued public investment.

Town of Brewster
Department of Natural Resources

Ellis Landing Parking Area

0 25 50 100 150 200 Feet
1 inch = 100 feet

NORTH

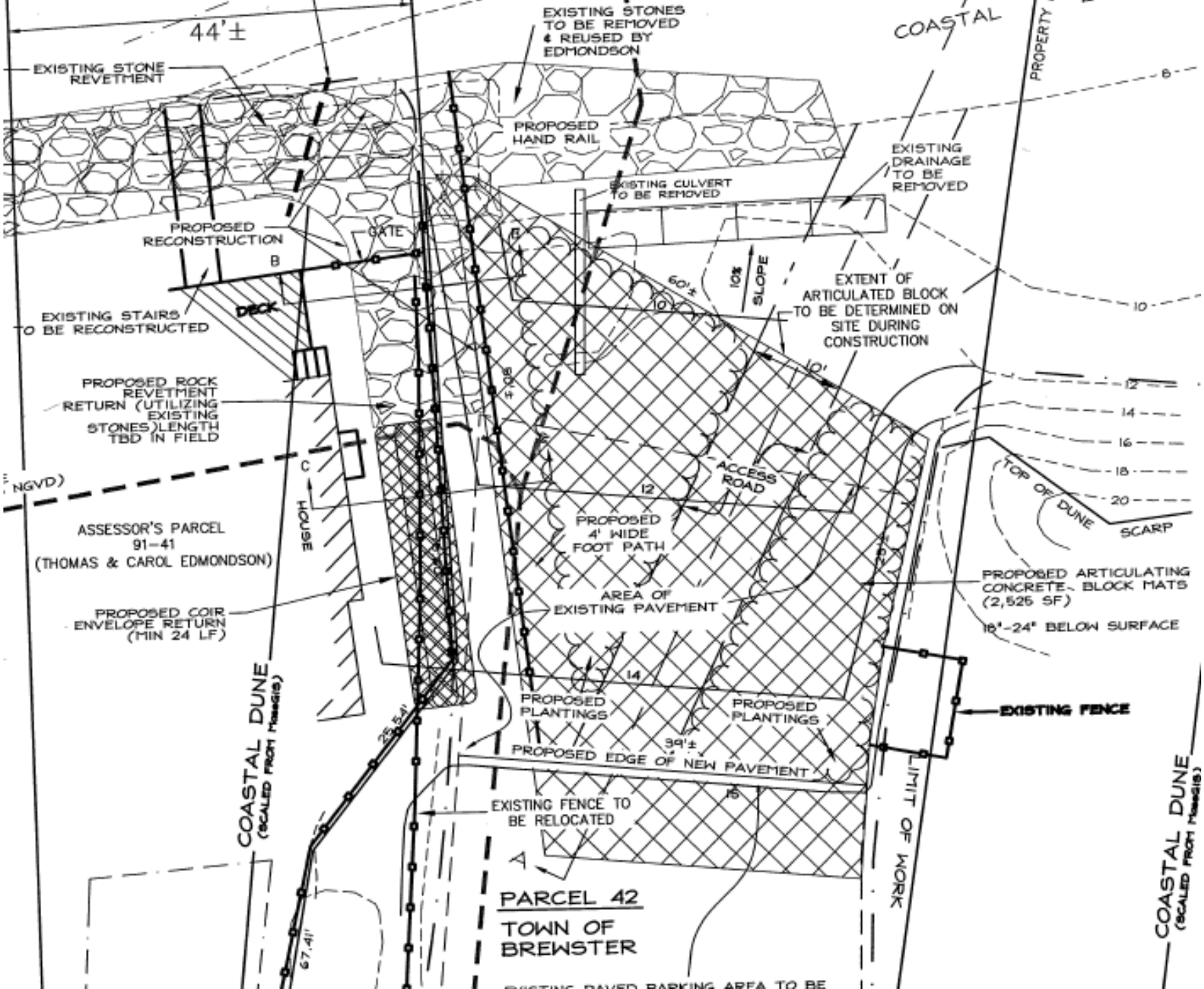
Ellis Landing March 2010

Ellis February 2011

Ellis May 2012 stormwater

February 2013

Ellis March 2014

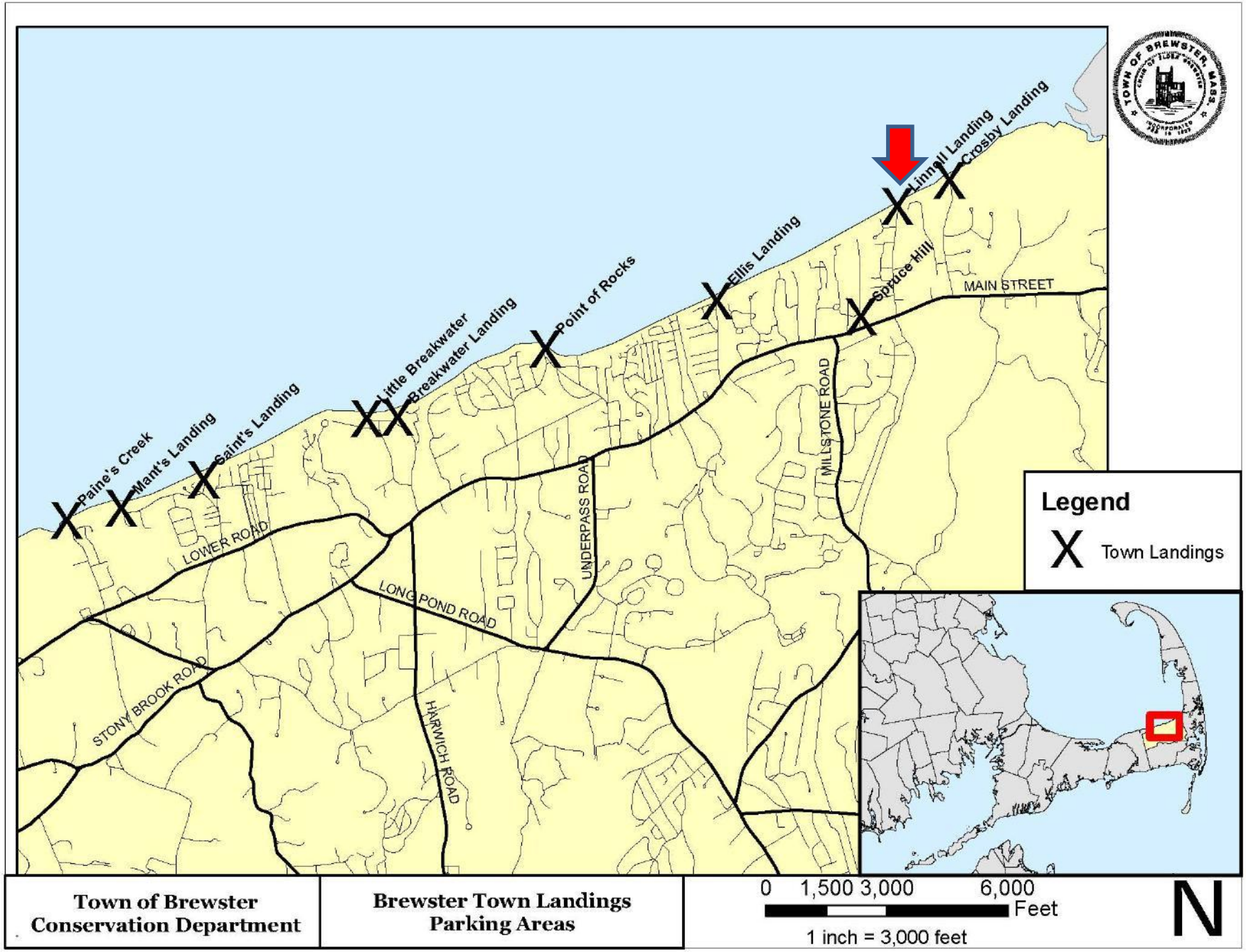

44'±
EXISTING STONE REVETMENT
EXISTING STONES TO BE REMOVED & REUSED BY EDMONDSON
COASTAL
PROPERTY
PROPOSED HAND RAIL
EXISTING DRAINAGE TO BE REMOVED
EXISTING CULVERT TO BE REMOVED
PROPOSED RECONSTRUCTION
GATE
B
DECK
EXISTING STAIRS TO BE RECONSTRUCTED
60'±
10%
SLOPE
EXTENT OF ARTICULATED BLOCK TO BE DETERMINED ON SITE DURING CONSTRUCTION
10'
PROPOSED ROCK REVETMENT RETURN (UTILIZING EXISTING STONES) LENGTH TBD IN FIELD
NGVD)
C
HOUSE
ASSESSOR'S PARCEL 91-41 (THOMAS & CAROL EDMONDSON)
ACCESS ROAD
12
PROPOSED 4' WIDE FOOT PATH
PROPOSED COIR ENVELOPE RETURN (MIN 24 LF)
AREA OF EXISTING PAVEMENT
PROPOSED ARTICULATING CONCRETE BLOCK MATS (2,525 SF)
16"-24" BELOW SURFACE
TOP OF DUNE
SCARP
14
PROPOSED PLANTINGS
PROPOSED PLANTINGS
EXISTING FENCE
39'±
PROPOSED EDGE OF NEW PAVEMENT
15
EXISTING FENCE TO BE RELOCATED
LIMIT OF WORK
COASTAL DUNE (SCALED FROM Mass GIS)
25.54'
67.41'
A
PARCEL 42
TOWN OF BREWSTER
COASTAL DUNE (SCALED FROM Mass GIS)

Other factors

- Stormwater basins to south along Ellis Landing Road, fall 2014.
- Sediment traps at junction with unpaved private roads.
- Protective of home to west, while also protective to dune habitat to east, but still allowing access to beach via a ramp.

Linnell Landing

- Stormwater (rain) discharges directly to beach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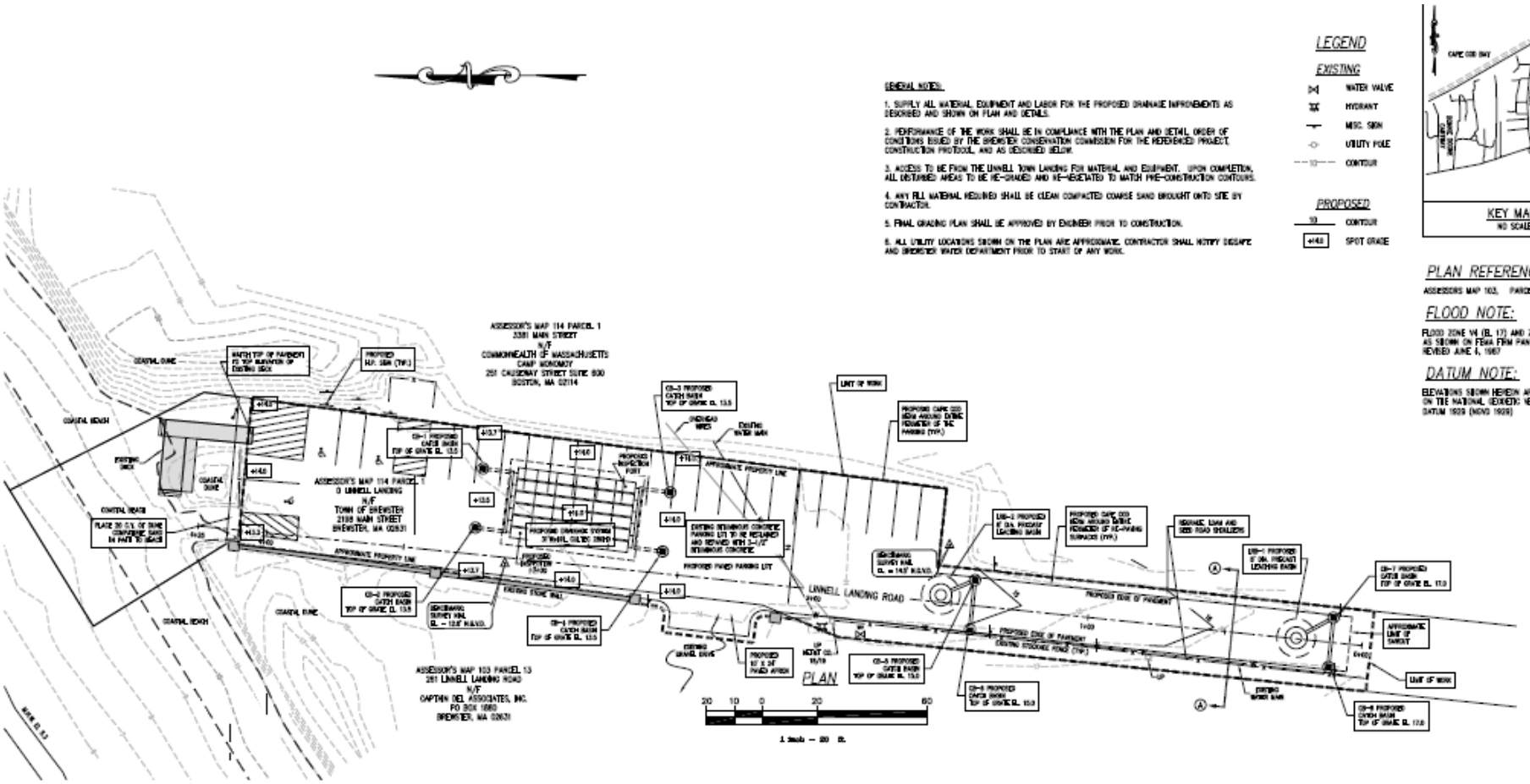
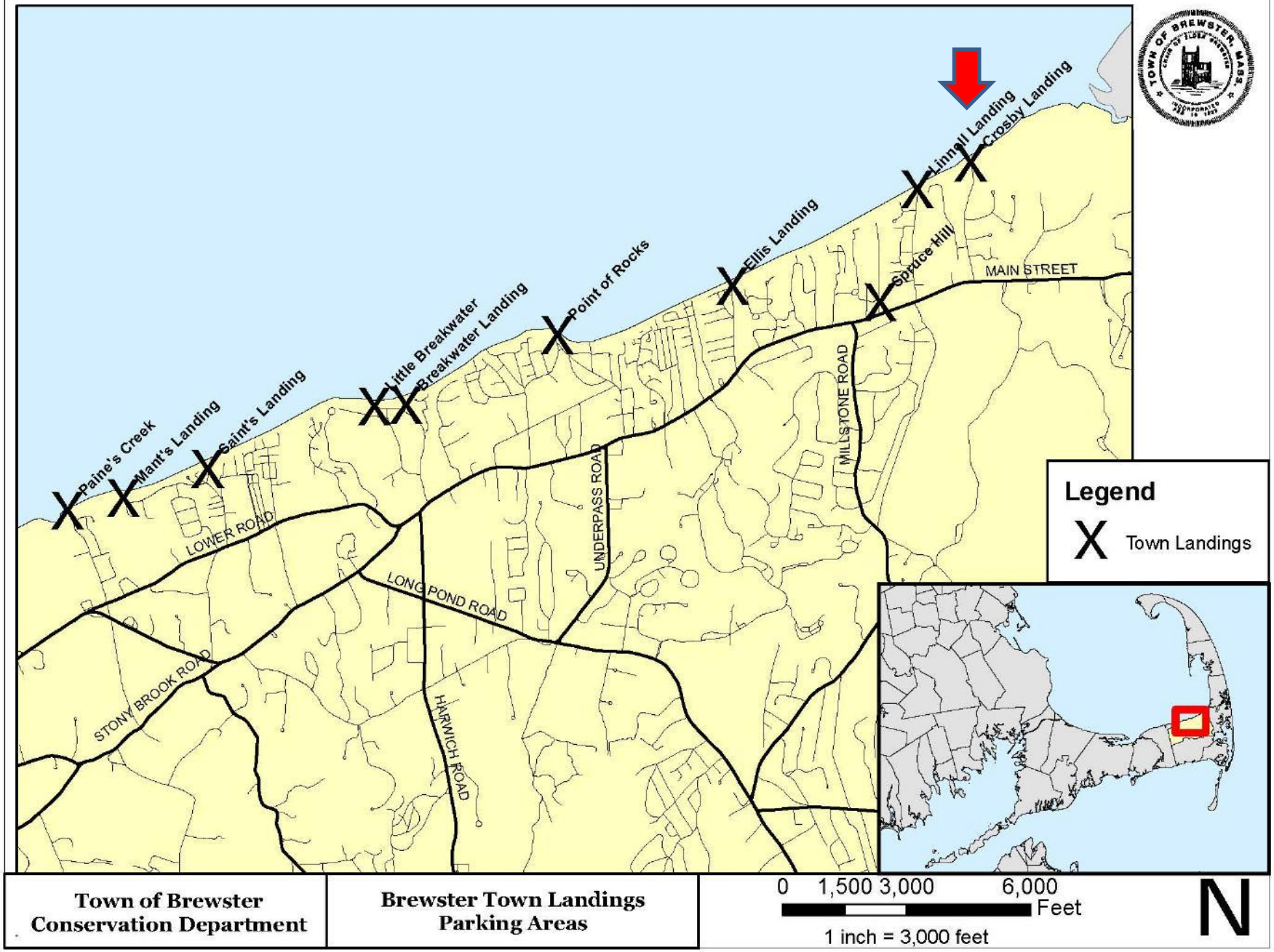
1 inch = 3,000 feet
N

Linnell Landing





Town of Brewster
Conservation Department

Brewster Town Landings
Parking Areas

Crosby Access Projects

Crosby August 2015

Crosby looking south

Linnell Landing

State property just east of Crosby

State property just east of Crosby

State property just west of Crosby

Looking south towards Mansion

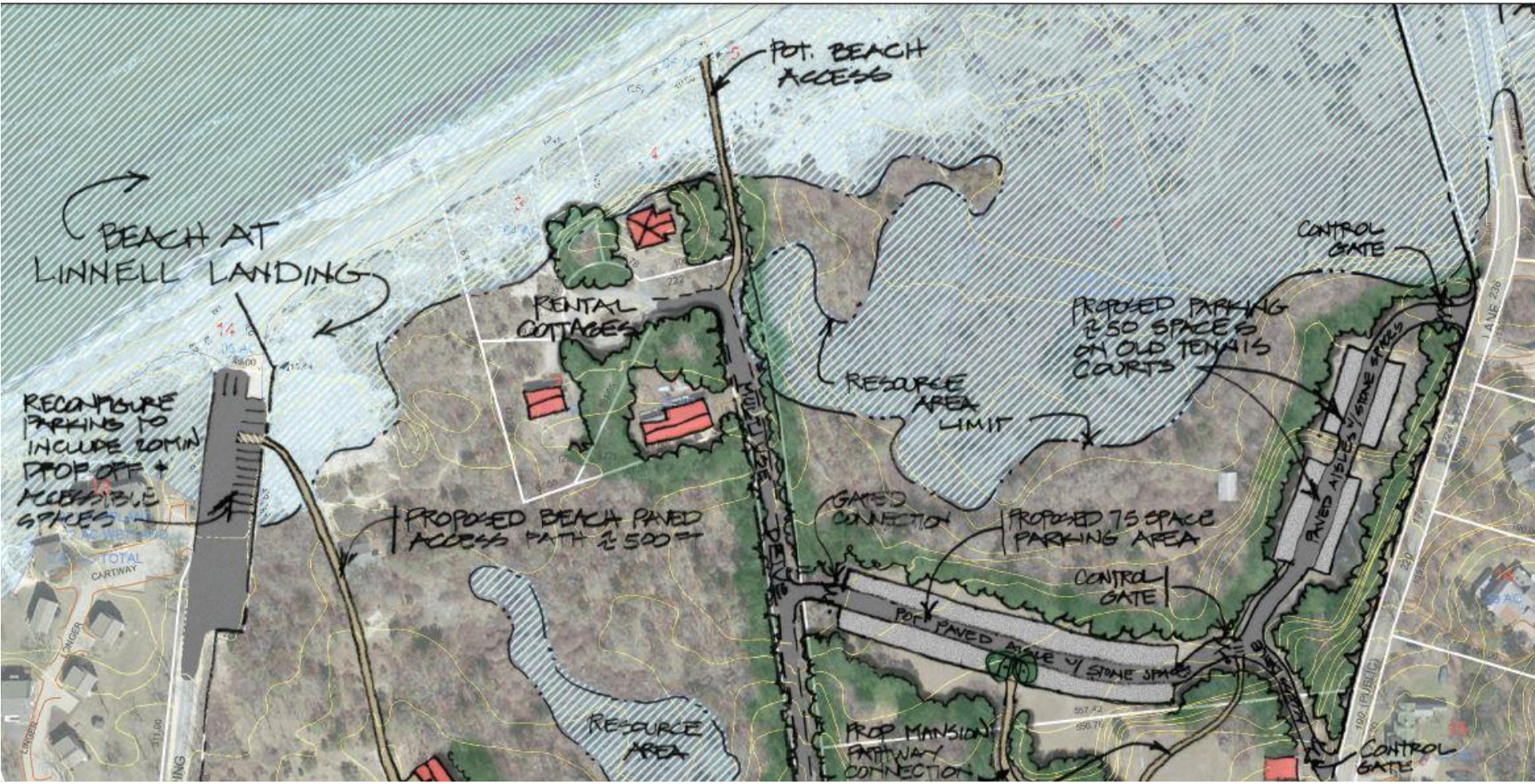
Crosby Mansion and field

Old tennis courts

Old tennis courts

Short term concept


Google


POT. BEACH ACCESS
BEACH AT LINNELL LANDING
RENTAL COTTAGES
RESOURCE AREA LIMIT
CONTROL GATE
PROPOSED PARKING ± 50 SPACES ON OLD TENNIS COURTS
RECONFIGURE PARKING TO INCLUDE 20MIN DROP OFF + ACCESSIBLE SPACES
PROPOSED BEACH PAVED ACCESS PATH ± 500 FT
GATED CONNECTION
PROPOSED 75 SPACE PARKING AREA
CONTROL GATE
POT. PAVED AISLE W/ STONE SPACES
PAVED AISLES W/ STONE SPACES
RESOURCE AREA
PROP MANSION PATHWAY CONNECTION
CONTROL GATE

Town of Brewster

PARKING AND ACCESS IMPROVEMENTS FOR STATE PROPERTY
FOR CROSBY MANSION, LINELLE LANDING AND CROSBY BEACH AREAS

Legend

DEPwetlands

N
W E
S

1 inch = 100 feet

300 Feet


POT. PHASE I BIKE PATH CONNECTOR TO NEW DRIVE AND EX. ROAD
ACCESS DRIVE
EX. CAPE REP LIGHTED PARKING
POT. ACCESS CONT. GATE
CAPE REP THEATER (LEASE AREA B, C AND D
OUTDOOR THEATER
250 FT
MAINTAIN WOODLAND BUFFER
MAINTAIN MIN. 50 FT BUFFER
POT. PHASE II BIKE PATH & CONNECTION TO REP THEATER
NEW CONNECTION
CAPE REP LEASE AREA 'A' LIMITS??
PROPOSED 22-24 FT WIDE BEACH ACCESS DRIVE
CAPE REP THEATER
PROP 10 FT. WIDE BIKE PATH
NEW DRIVEWAY ACCESS POINT
POTENTIAL BIKE PATH CONNECTION - RT 6A CROSSING W/ BLINKING LIGHTS
ROUTE 6A
EX. PARKING
EX. BIKE SHOP
EXISTING CAPE COD RAIL TRAIL
DRAKE
CROSBY
NATHANS
PASTURE
LINNELL
MIST
LANE
WING
LANDING
ROAD
MAIN
STREET

Other landings

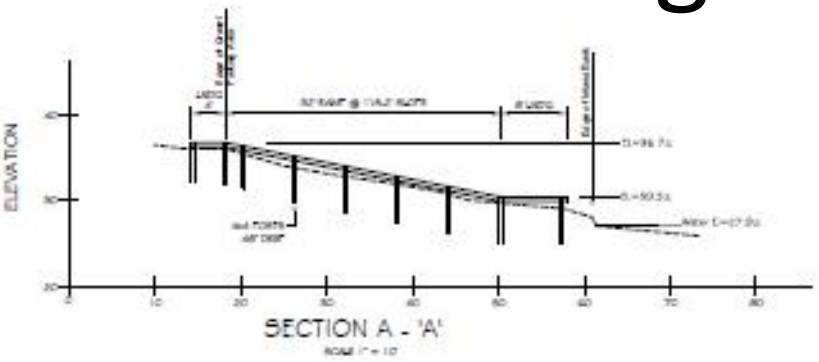
- Fall 2015
  - Slough Pond Landing redesign
  - Fisherman's Landing stormwater/parking
- Ongoing
  - Long Pond Boat Ramp redesign

Slough Pond Landing

Slough Pond

- Eroding bank (wave action, boat launching)
- Eroding slope
- Unsafe conditions for launching car top boats
- Neighbor concerns
- Permitting in August/September 2015

Slough Pond Landing



NOTES:

ROAD SHOULDER.

1. THE EXISTING DIRT SHOULDER SHALL BE TOPPED WITH 3-4 INCHES OF LOAM AND SEEDED WITH A CONSERVATION GRASS SEED MIX.
2. THE EXISTING GRAVEL SHOULDER, BEYOND THE DESIGNATED PARKING AREA, SHALL BE REMOVED AND REPLACED WITH 3-4 INCHES OF LOAM AND SEEDED WITH A CONSERVATION SEED MIX.
3. TWO TIMBER WHEEL STOPS SHALL BE INSTALLED ALONG ROADSIDE, TO THE EAST OF THE GRAVEL PARKING AREA.
4. CONCRETE (OR TIMBER) WHEEL STOPS ARE TO BE PLACED AS SHOWN ON THE PLAN VIEW. WHEEL STOPS ARE TO BE ANCHORED USING TWO PIECES OF #5 REBAR PER STOP 24" LONG INTO THE GROUND.

TIMBER RAMP.

5. THE TIMBER RAMP SHALL BE CONSTRUCTED OF USING 2X6 PRESSURE TREATED STOCK FOR JOISTS AND 2X6 DECKING.
6. ALL LUMBER TO BE NEW# CCA TREATED WOOD OR OTHER APPROVED EQUAL.
7. ALL DECKING SHALL BE SET 1/4 INCH.
8. ALL DECKING SHALL BE FINISHED WITH A NONSLIP SURFACE.

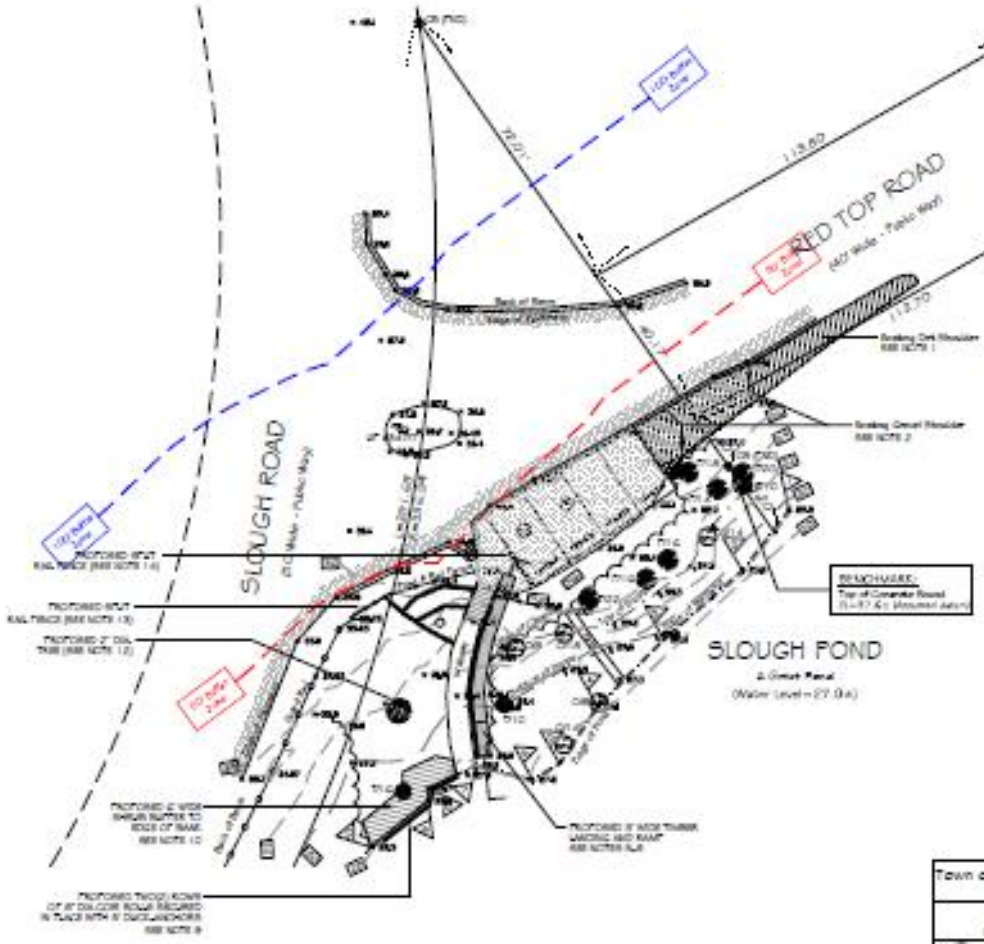
COIR ROLL & REVEGETATION.

9. TWO (2) ROWS OF 8 INCH DIAMETER COIR ROLLS ALONG THE OUTSIDED FACE OF THE RAMP. EACH ROLL SHALL BE SECURED USING A FOOT LONG 1/8" GALVANIZED WIRE STAPLE WITH WOOD HUB. TRIANGULAR SHAPED ANCHORS. WIRE STAPLES SHALL BE ONE FOOT AND HAVE EACH PIN PLACED AT A MINIMUM OF 30 INCHES BELOW GRADE.
10. A TOTAL OF 15 2-3 GAL HIGHBUSH BLUEBERRY SHRUBS SHALL BE PLANTED A FOOT CHECKERED WITHIN THE NOTED PLANTING BUFFER ON THE PLAN VIEW.
11. THE EXISTING GROUND SURFACE TO THE WEST OF THE EXISTING PATHWAY SHALL BE TOP DRESSED WITH 4 INCHES OF LOAM AND THEN SEEDED WITH A CONSERVATION GRASS SEED MIX.
12. THE TYPE OF TREE TO BE PLANTED SHALL BE _____.

FENCING.

13. A NEW SPLIT RAIL FENCE SHALL BE INSTALLED AT THE TOP TO THE SLOPE ADJACENT TO THE CHANNEL TO MINIMIZE FOOTTRAFFIC TRAFFIC.
14. A NEW SECTION OF SPLIT RAIL FENCE SHALL BE INSTALLED ADJACENT OF THE PARKING AREA, AS SHOWN ON THE PLAN VIEW.

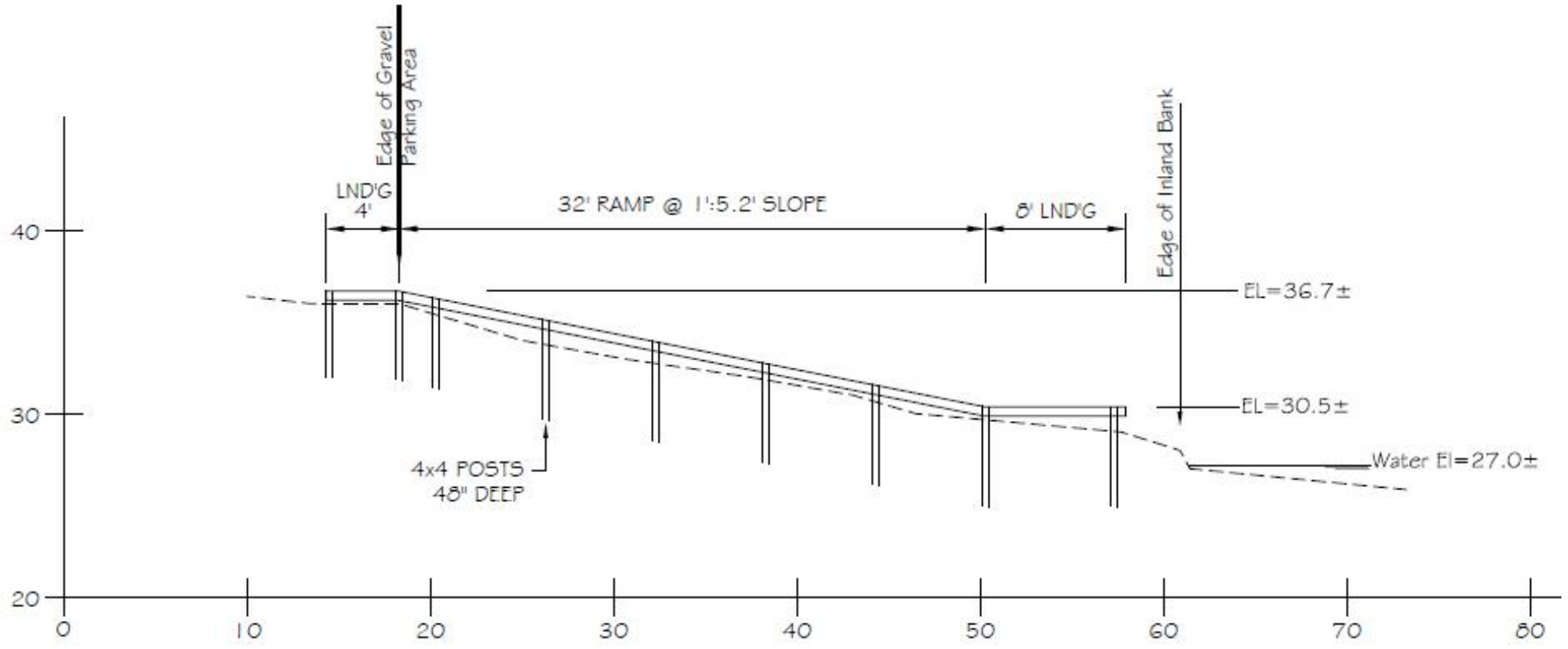
PLANTING DETAIL

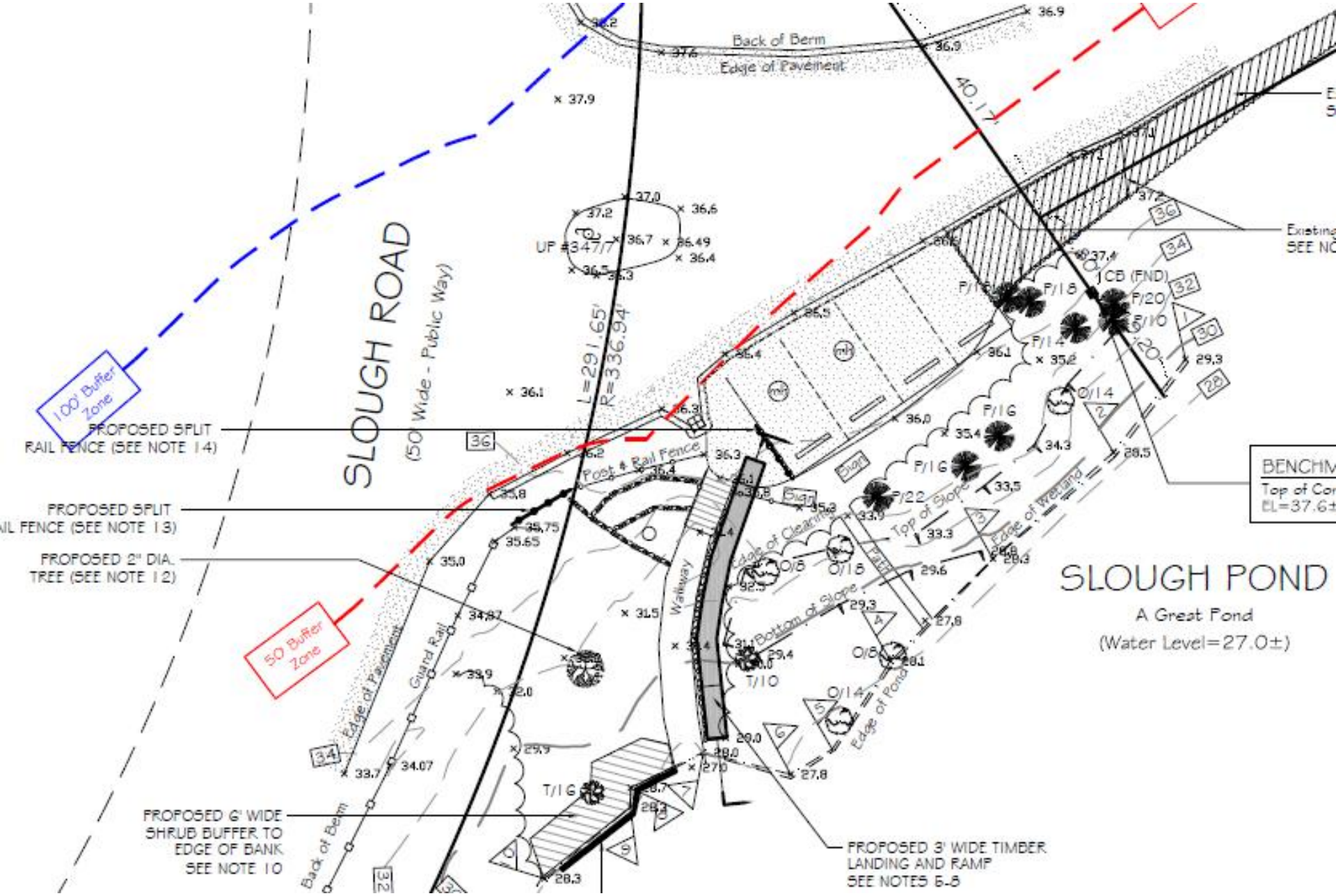


Town of Brewster Natural Resources Dept.

PROPOSED SITE PLAN

Ramp for car top boats




SLOUGH ROAD
(50' Wide - Public Way)
L=291.65'
R=336.94'
Back of Berm
Edge of Pavement
100' Buffer Zone
50' Buffer Zone
PROPOSED SPLIT RAIL FENCE (SEE NOTE 14)
PROPOSED SPLIT RAIL FENCE (SEE NOTE 13)
PROPOSED 2" DIA. TREE (SEE NOTE 12)
PROPOSED 6' WIDE SHRUB BUFFER TO EDGE OF BANK SEE NOTE 10
PROPOSED 3' WIDE TIMBER LANDING AND RAMP SEE NOTES 5-8
Existing
SEE NO
BENCHM
Top of Co
EL=37.6±
SLOUGH POND
A Great Pond
(Water Level=27.0±)
Post & Rail Fence
Guard Rail
Walkway
Edge of Clearing
Top of Slope
Edge of Wetland
Bottom of Slope
Edge of Pond
Back of Berm
Edge of Pavement
UP #347/7
JCB (FND)

Fisherman's Landing

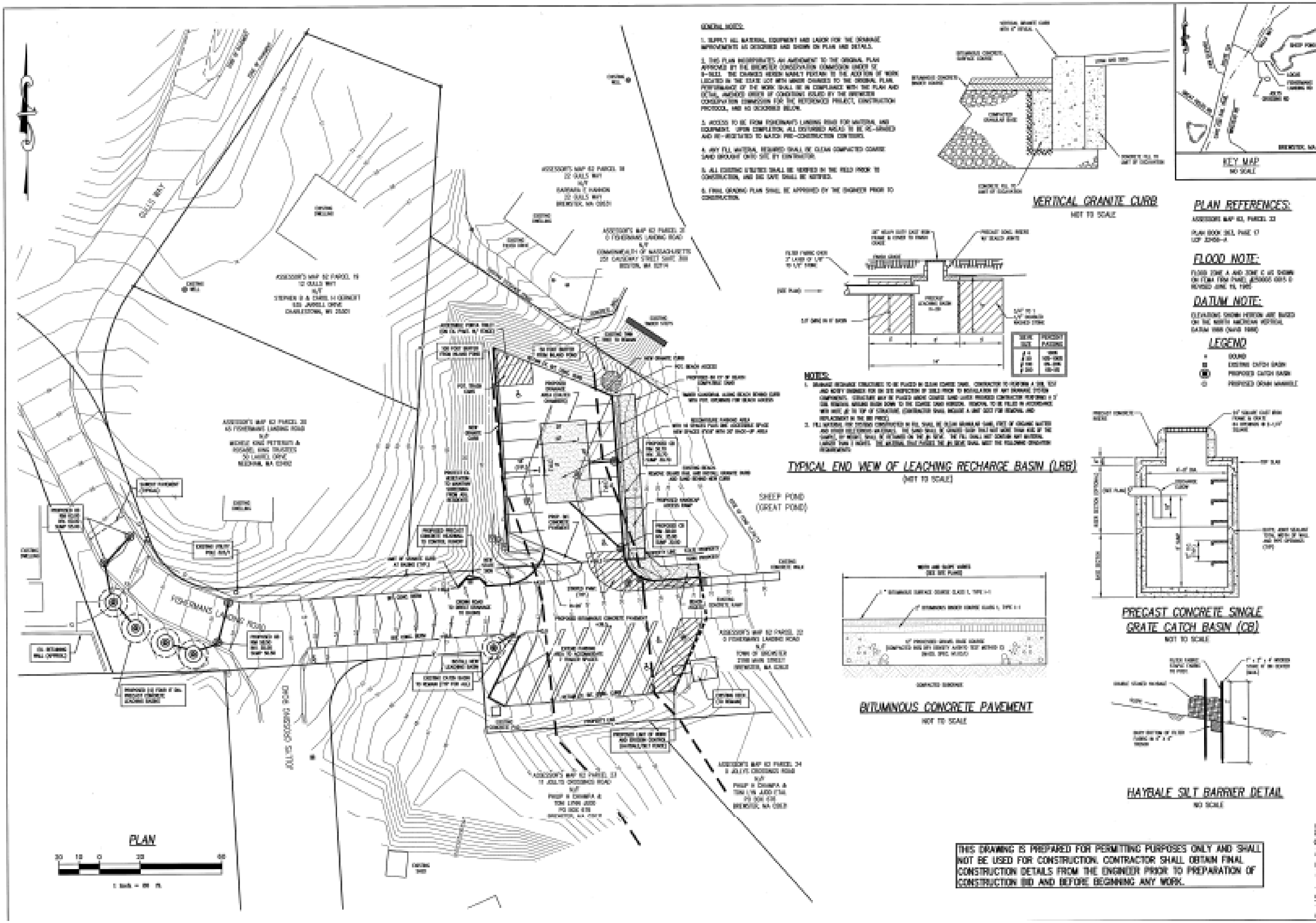
Fisherman's Landing

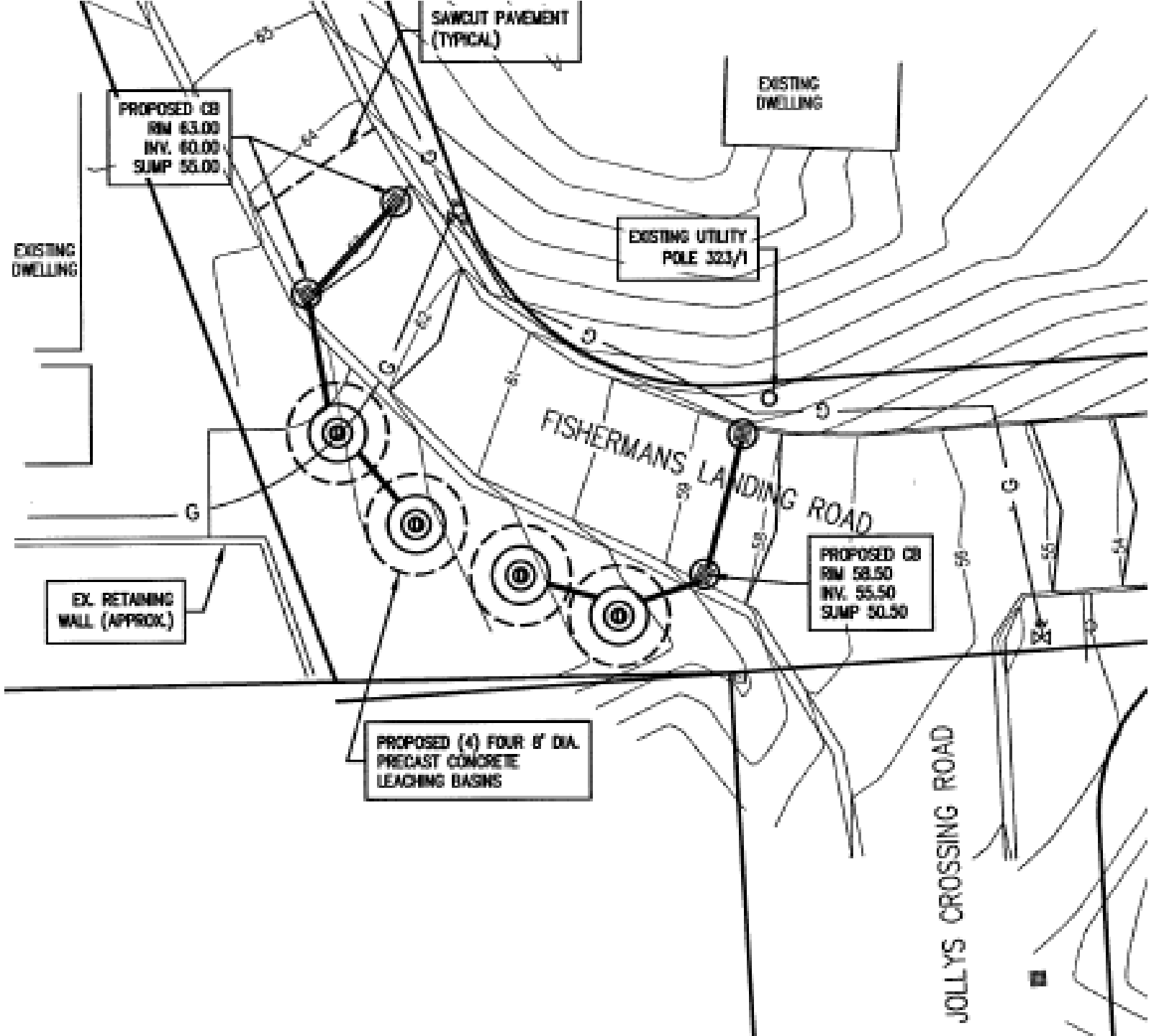
- Stormwater concerns; aging infrastructure, insufficient to capture stormwater
- Direct discharge to high quality waters of Sheep Pond
- Erosion to beach
- Concerns over parking for beachgoers versus fishermen
- ½ owned by State, ½ by Town

Fisherman’s Landing

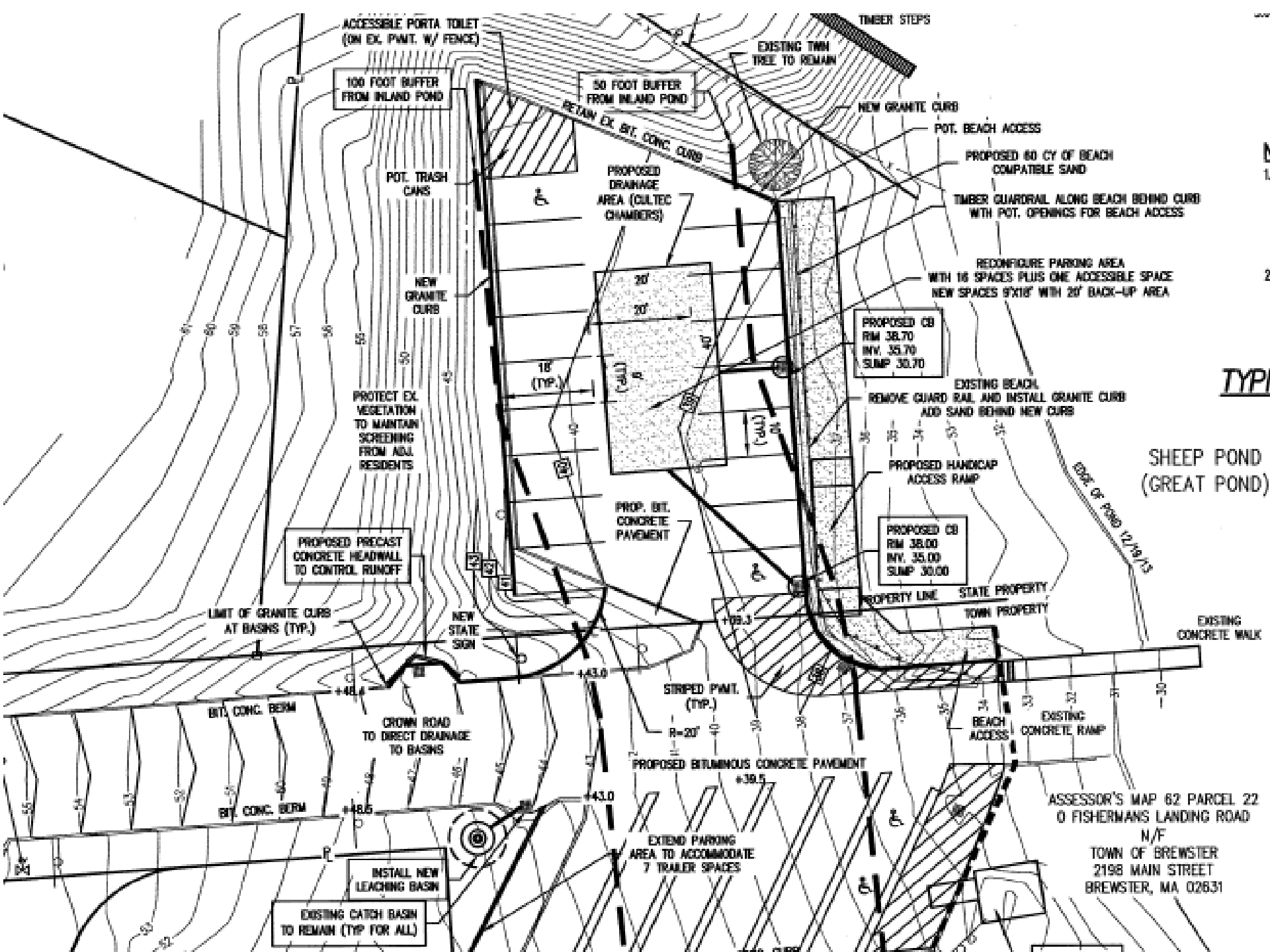
Fisherman’s Landing

Fisherman’s Landing


VERTICAL GRANITE CURB
NOT TO SCALE
KEY MAP
NO SCALE
PLAN REFERENCES:
FLOOD NOTE:
DATUM NOTE:
ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)
LEGEND
BOUND
EXISTING CATCH BASIN
PROPOSED CATCH BASIN
PROPOSED DRAIN MANHOLE
TYPICAL END VIEW OF LEACHING RECHARGE BASIN (LRB)
NOT TO SCALE
SHEEP POND
(GREAT POND)
PRECAST CONCRETE SINGLE GRATE CATCH BASIN (CB)
NOT TO SCALE
BITUMINOUS CONCRETE PAVEMENT
NOT TO SCALE
HAYBALE SILT BARRIER DETAIL
NO SCALE
PLAN
THIS DRAWING IS PREPARED FOR PERMITTING PURPOSES ONLY AND SHALL NOT BE USED FOR CONSTRUCTION. CONTRACTOR SHALL OBTAIN FINAL CONSTRUCTION DETAILS FROM THE ENGINEER PRIOR TO PREPARATION OF CONSTRUCTION BID AND BEFORE BEGINNING ANY WORK.

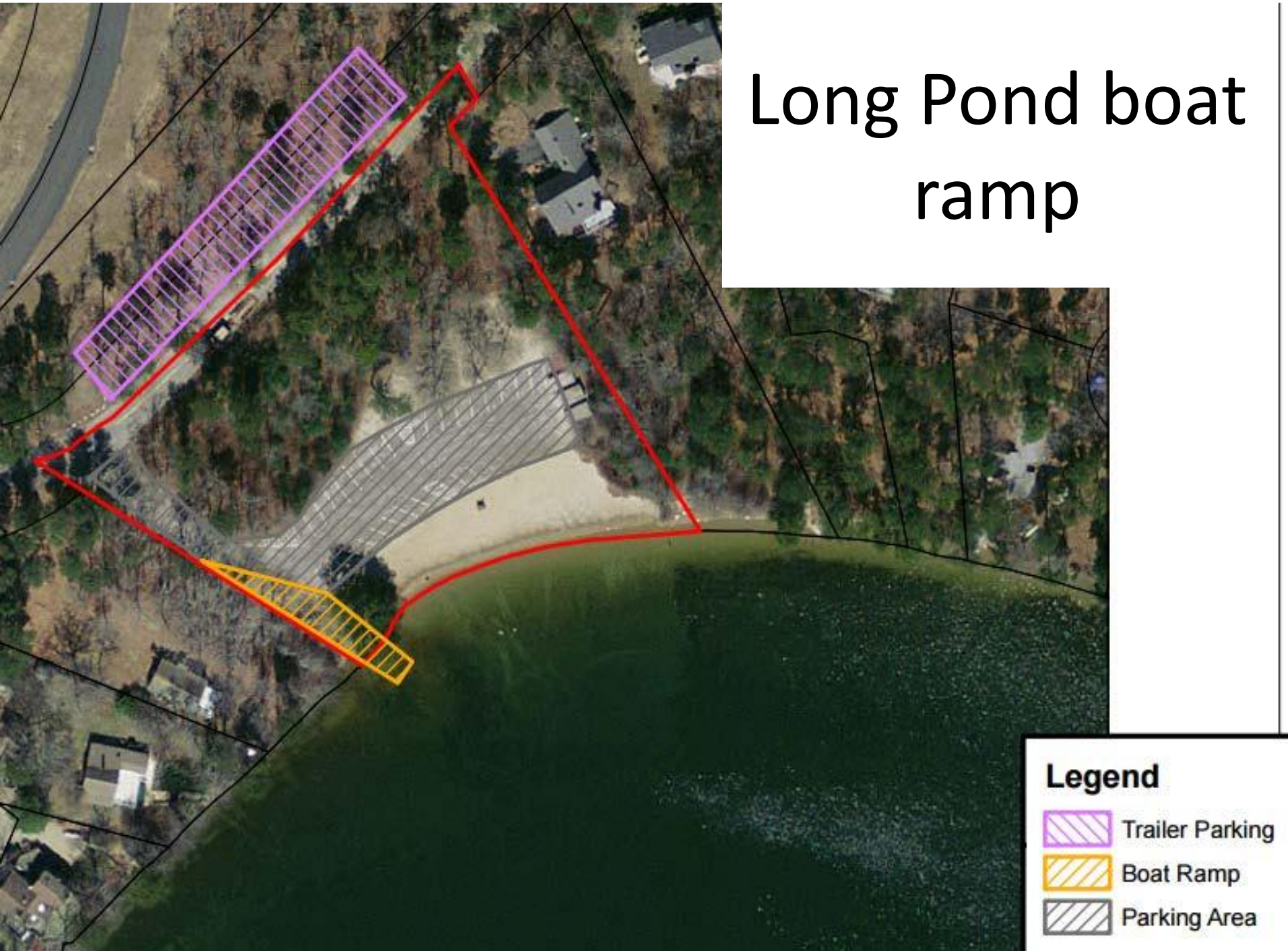

SAWCUT PAVEMENT (TYPICAL)
EXISTING DWELLING
PROPOSED CB RIM 63.00 INV. 60.00 SUMP 55.00
EXISTING UTILITY POLE 323/1
EXISTING DWELLING
FISHERMANS LANDING ROAD
PROPOSED CB RIM 58.50 INV. 55.50 SUMP 50.50
EX. RETAINING WALL (APPROX.)
PROPOSED (4) FOUR 8' DIA. PRECAST CONCRETE LEACHING BASINS
JOLLYS CROSSING ROAD

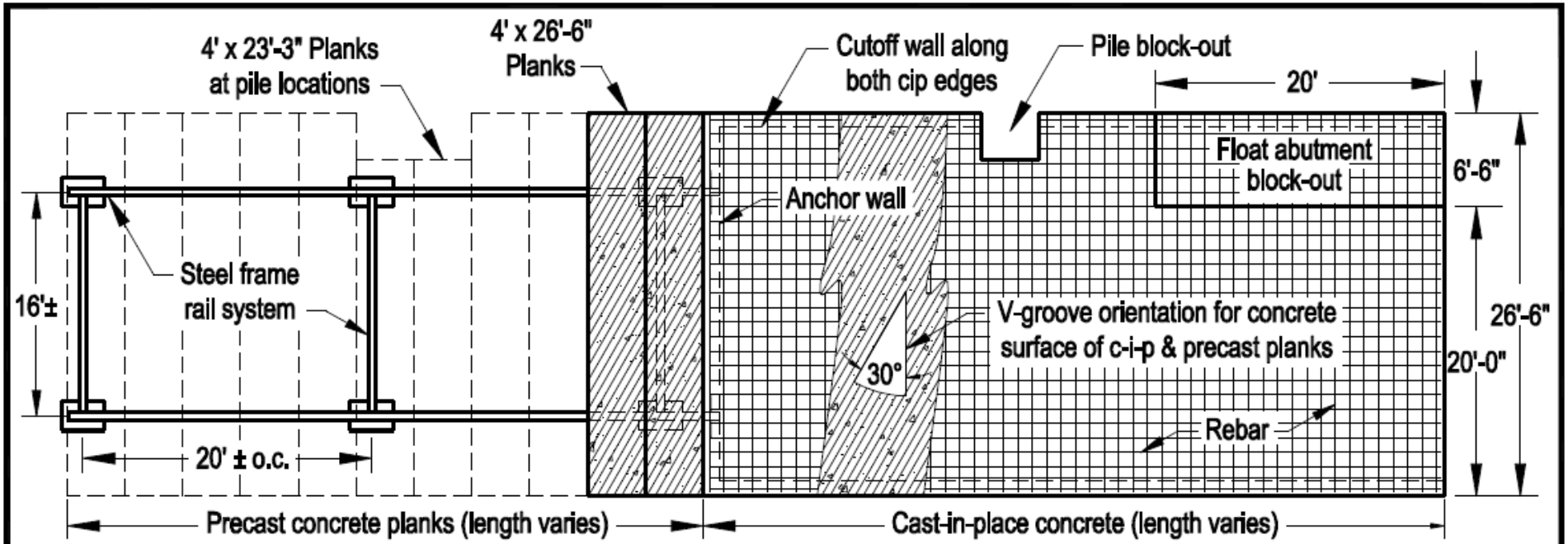
Fishermens Landing Rd


ACCESSIBLE PORTA TOILET (ON EX. PVMT. W/ FENCE)
100 FOOT BUFFER FROM INLAND POND
50 FOOT BUFFER FROM INLAND POND
TIMBER STEPS
EXISTING TWIN TREE TO REMAIN
NEW GRANITE CURB
POT. BEACH ACCESS
RETAIN EX. BIT. CONC. CURB
PROPOSED 60 CY OF BEACH COMPATIBLE SAND
POT. TRASH CANS
PROPOSED DRAINAGE AREA (CULTEC CHAMBERS)
TIMBER GUARDRAIL ALONG BEACH BEHIND CURB WITH POT. OPENINGS FOR BEACH ACCESS
RECONFIGURE PARKING AREA WITH 16 SPACES PLUS ONE ACCESSIBLE SPACE NEW SPACES 9'X18' WITH 20' BACK-UP AREA
NEW GRANITE CURB
20'
20'
PROPOSED CB RIM 38.70 INV. 35.70 SUMP 30.70
18' (TYP.)
EXISTING BEACH REMOVE GUARD RAIL AND INSTALL GRANITE CURB ADD SAND BEHIND NEW CURB
PROTECT EX. VEGETATION TO MAINTAIN SCREENING FROM ADJ. RESIDENTS
PROPOSED HANDICAP ACCESS RAMP
SHEEP POND (GREAT POND)
EDGE OF POND 12/19/13
PROP. BIT. CONCRETE PAVEMENT
PROPOSED PRECAST CONCRETE HEADWALL TO CONTROL RUNOFF
PROPOSED CB RIM 38.00 INV. 35.00 SUMP 30.00
PROPERTY LINE
STATE PROPERTY
TOWN PROPERTY
LIMIT OF GRANITE CURB AT BASINS (TYP.)
NEW STATE SIGN
+39.3
EXISTING CONCRETE WALK
+43.0
+40.4
BIT. CONC. BERM
STRIPED PVMT. (TYP.)
CROWN ROAD TO DIRECT DRAINAGE TO BASINS
R=20'
BEACH ACCESS
EXISTING CONCRETE RAMP
PROPOSED BITUMINOUS CONCRETE PAVEMENT
+39.5
+43.0
BIT. CONC. BERM
+40.5
EXTEND PARKING AREA TO ACCOMMODATE 7 TRAILER SPACES
INSTALL NEW LEACHING BASIN
EXISTING CATCH BASIN TO REMAIN (TYP FOR ALL)
ASSESSOR'S MAP 62 PARCEL 22
0 FISHERMANS LANDING ROAD
N/F
TOWN OF BREWSTER
2198 MAIN STREET
BREWSTER, MA 02631

Long Pond Landing and ramp

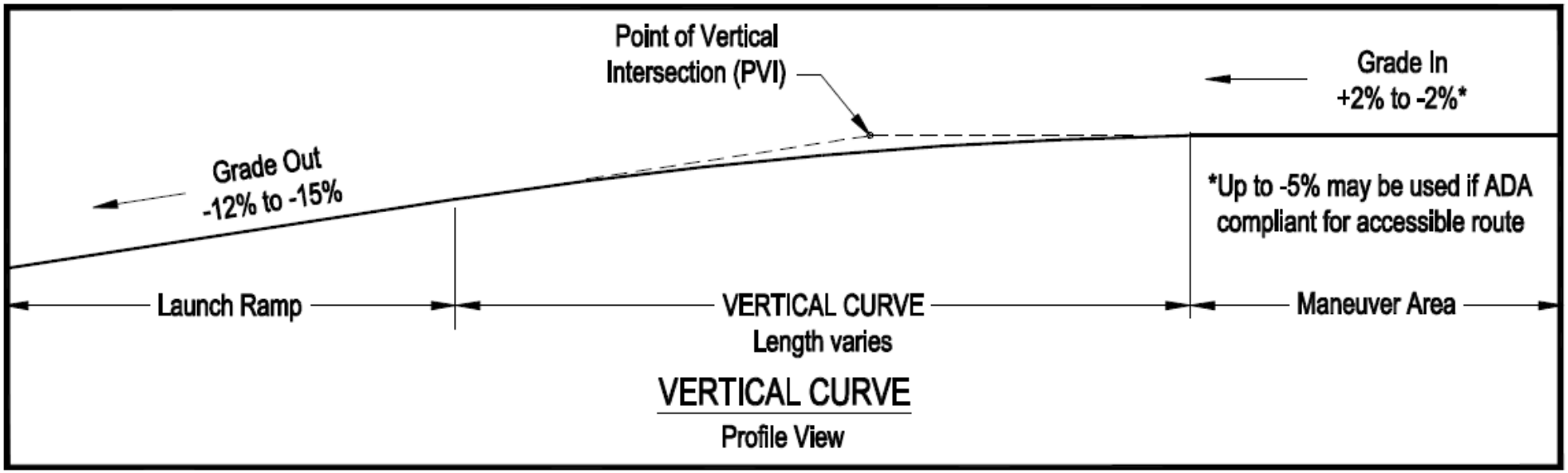
Long Pond boat ramp





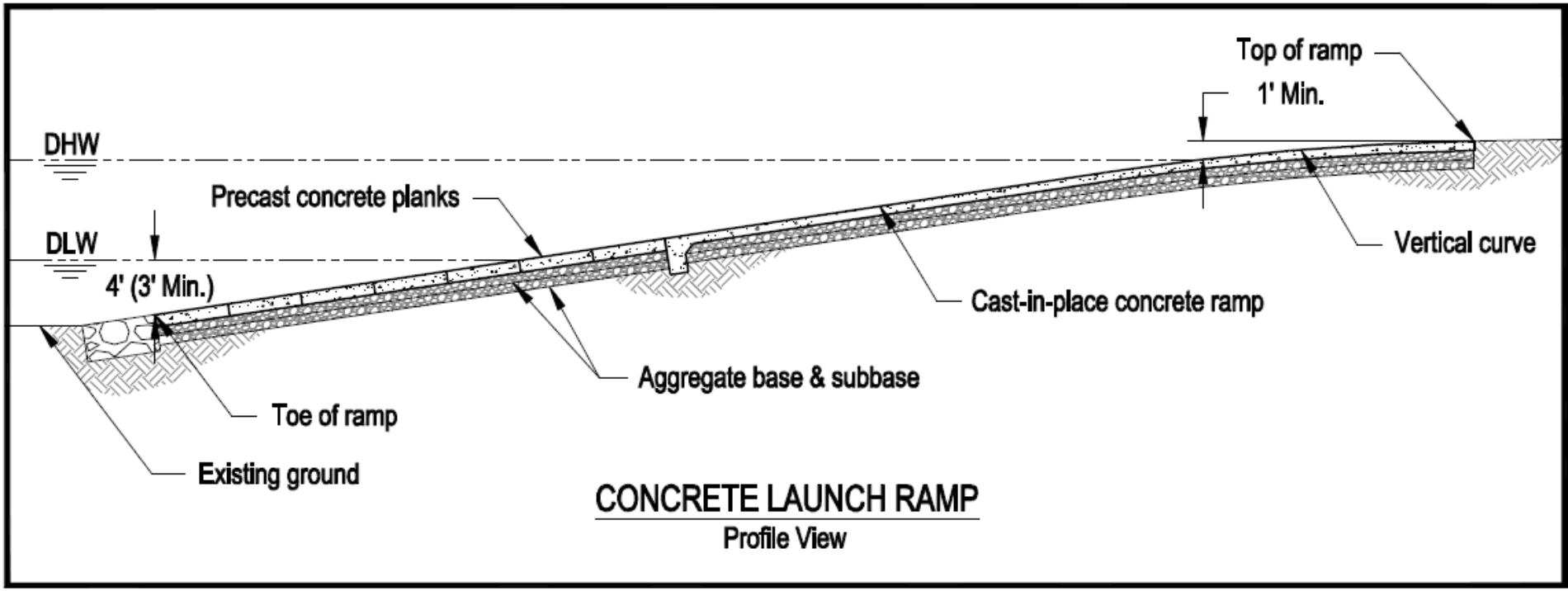
TYPICAL LAUNCH RAMP LAYOUT

One-lane launch ramp with floats on side



VERTICAL CURVE

Profile View



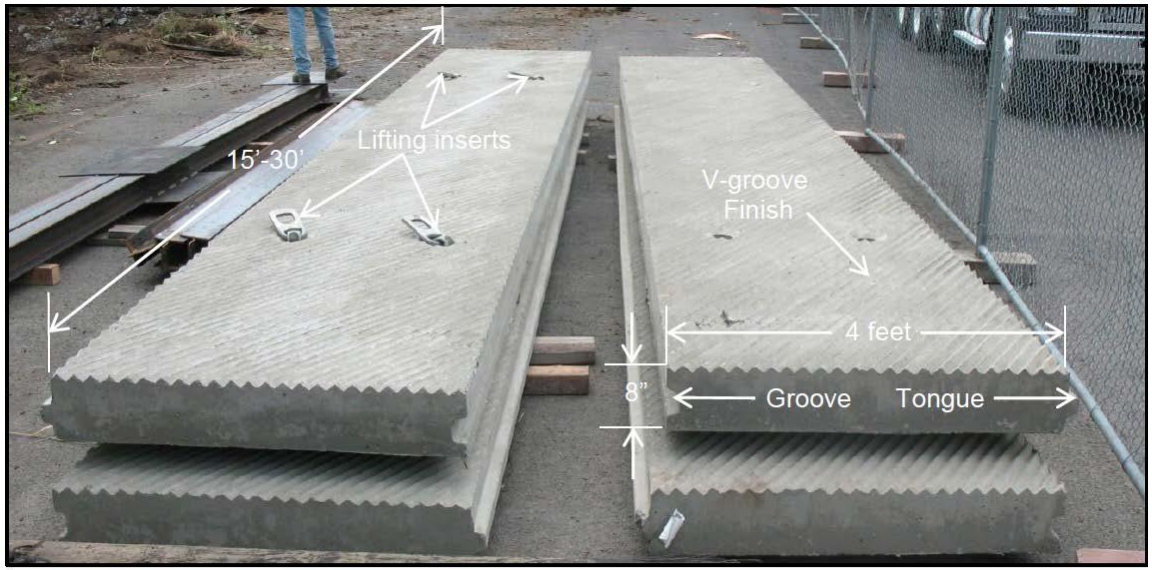


Photo 3-23 Precast concrete plank design elements